



**US Army Corps
of Engineers** ®
New Orleans District

**HSDRRS – Lake Pontchartrain and
Vicinity (LPV) Mitigation**
65% - Design Document Report (DDR)

**Bayou Sauvage Flood
Side Brackish Marsh
Restoration Project**
Orleans Parish, Louisiana

Draft Design Document Report
ED 13-050

Prepared by:

US Army Corps of Engineers
New Orleans District - Engineering Division (CEMVN-ED-E)
November 2014

TABLE OF CONTENTS

1. Summary.....	1
2. Project Description.....	1
3. PDT Team Members.....	3
4. References & Criteria Wavier Approvals.....	4
5. Engineering Studies, Investigations & Design	5
5.1 Project Features. Location and site plan.....	5
5.2 Hydrology.....	6
5.3 Placement of Dredged Material.....	7
5.4 Geotechnical Investigations.....	7
5.5 Civil Design	7
5.6 Real Estate Determination and Acquisitions	15
5.7 Relocations	15
6. Implementation of Lessons Learned.....	15
7. Cost Estimates.....	15
7.1 Independent Government Estimate (IGE)	15
7.2 MCACES Updates.....	16
8. Technical Review Documentation.....	17
9. APPENDICES	17
Appendix A: Figures	A-1
Appendix B: Survey Reports.....	B-1
Appendix C: Quantity Calculations.....	C-1
Appendix D: Geotechnical Investigations.....	D-1

INTRODUCTION:

This document outlines the information required IAW ER 1110-2-1150, August 31, 1999, Appendix D, Content and Format of Design Documentation Report. The DDR is an implementation document that provides the technical basis for the plans and specifications. It serves mainly as a summary of the design to be used by the PDT during development of the P&S. The DDR is primarily an engineering document developed by the lead design engineer in cooperation with the PDT. It shall be sufficiently detailed for each technical specialty so that the criteria which were used, the critical assumptions which were made, and the analytical methods which were used will be evident for purposes of review and historical documentation. It should contain a summary of important calculation results. It should be sufficient to support the execution of the ITR process without reference to other design records. DDR is not finalized until the project construction is completed. Design decisions made in connection with contract modifications during construction shall be added to the DDR. It should contain the Statement of Technical and Legal Review and the resolution of critical changes during construction.

1. Summary

The project consists of three marsh creation areas, Bayou Sauvage Floodside Site 4 (BSFS-4), Bayou Sauvage Floodside Site 5 (BSFS-5) and Turtle Bayou North (TBN). The BSFS-4 and BSFS-5 marsh restoration areas are located in the far south-eastern lobe of Lake Pontchartrain, east of Interstate 10. The site selection for Bayou Sauvage Brackish marsh was reformulated to utilize areas without poor soil and deep water conditions resulting in the selection of BSFS-4 and BSFS-5 with a total acreage of 333 acres of brackish marsh restoration and nourishment. Fill material for BSFS-4 and BSFS-5 will be dredged from a borrow site in Lake Pontchartrain approximately 4,000 ft from BSFS-5 and 2,000 ft from BSFS-4. The borrow site has a footprint of 459 acres and will also be used for the Turtle Bayou North marsh restoration. See Figure 1 in Appendix A for the, "Overall Marsh Creation Plan".

This brackish marsh restoration project will provide the required 8.79 AAHU of on- Refuge brackish marsh restoration and approximately 86.58 AAHU of general brackish marsh restoration, through restoration of 49 acres at BSFS4 and the restoration of 194 and nourishment of 82 acres at BSFS5. Cumulatively, the implementation of BSFS4 and BSFS5 would result in the creation of approximately 95.37 AAHU of brackish marsh within the BSNWR."

2. Project Description

The Bayou Sauvage Brackish Marsh restoration project is located in the far south-eastern lobe of Lake Pontchartrain, east of Interstate 10. The project plan consists of two areas of open water/broken marsh, which would be filled and/or restored to provide a healthy marsh platform. The two areas are BSFS-4 which is approximately 51 Acres and BSFS-5 which is 282 acres. BSFS-4 and BSFS-5 are on the unprotected side of the HSDRRS. Both areas are within the existing marsh environment, at an adequate distance from the lake shoreline so that shoreline hardening for marsh protection is not considered warranted. Refer to Figure -1 in Appendix A for the, "Overall Marsh Creation Plan".

The BSFS-4 area is the northernmost proposed marsh footprint and is located immediately east of Hwy 11, fronting the community of Irish Bayou in Orleans Parish, Louisiana. Completion of this project would result in marsh creation that would provide some buffer to U.S. Highway 90, Interstate 10, and the Irish Bayou Community. Survey data indicates fairly uniform bottom elevations ranging from approximately -2.0' to -2.5' NAVD88 (2006.81). Two soil borings reveal an approximate 4-foot organic peat layer underlain by very soft clays. Significant settlement of the dredge-placed sediment is anticipated.

The BSFS-5 area is the southern proposed marsh footprint and is located approximate 2.5 miles south, south-east of BSFS-4. The southern feature is approximately 0.5 miles north of Chef Menteur Highway (Hwy 90). Survey data indicates a range of existing elevations within the site. The open water area bottom elevations are similar to the northern site, ranging from -1.0 to -2.5 ft (NAVD88 2006.81). Three soil borings in the site reveal an approximate 8-foot organic peat layer underlain by very soft clays and silty sand layers. Significant settlement of the dredge filled platform is anticipated.

The required fill elevation of dredge fill for BSFS-4 is to elevation +3.5' NAVD88 (2006.81), ultimately to hit a target marsh elevation to +1.0' NAVD88 (2006.81). The required fill elevation of dredge fill for BSFS-5 is to elevation +4.0' NAVD88 (2006.81), ultimately to hit a target marsh elevation to +1.0' NAVD88 (2006.81). Both features would require total perimeter retention to hold dredge material and allow for vertical accretion. Feature BSFS-4 will require approximately 7,040 linear feet of earthen retention dike. Feature BSFS-5 will require approximately 17,982 linear feet of earthen retention dike and 2,000 linear feet for a cross dike. The BSFS-4 retention dike will be constructed to elevation +4.5', with a 5 foot wide crown, to provide 1 ft of freeboard above the required fill elevation of +3.5'. The BSFS-5 retention dike will be constructed to elevation +5.0', with a 5 foot wide crown, to provide 1 ft of freeboard above the required fill elevation of +4.0ft. Due to poor soil conditions, 20 foot stability berms are required both BSFS-4 and BSFS-5 retention dikes. All slopes of the dikes will have 1-foot vertical on 4-foot horizontal side slopes. Retention dikes would be constructed, using marsh buggies for access and obtained from within the marsh creation areas.

BSFS-5 will require two bulkheads at the locations where interior channels are too deep for normal dike construction. The bulkheads will be constructed of vinyl sheet piles and timber piles. These bulk heads will be removed in a separate contract when dike degrading and planting takes place.

The eastern retention dike of BSFS4 paralleling the lake shoreline, is proposed to remain in place post marsh construction to enhance the existing shoreline along this reach of lakefront and provide additional protection to the newly created marsh. The remaining reaches of standard retention dike for both features would be gapped approximately a year after the final lift, upon settlement and dewatering of the created marsh platform. The marsh footprint would be planted upon satisfactory settlement and dewatering of the marsh platform. The shoreline restoration feature along Irish Bayou would also be planted. Plugs of appropriate marsh vegetation would be planted over 100 percent of the marsh restoration acreage on 7-foot centers.

3. PDT Team Members

The PDT members for the HSDRRS-LPV Mitigation Bayou Sauvage Brackish Marsh Restoration Project are listed below in Table 1.

PE: Professional Engineer, PG: Professional Geologist, EI: Engineering Intern, LSBA: LA State Bar Association --: Indicates no data or not registered

Project Delivery Team					
Name	Professional Registration	Discipline	Office	Area of Responsibility	Years of Experience
Soheila Holley	P.E.	PM	PRO	Sr. Project Manager	20
Patrick Erwin	E.I.	PM	PRO	Project Manager	4
Wayne Duplantier	E.I.	Civil	ED-E	Project Engineer	9
Keith O’Cain	-	Civil	ED-L	Technical Manager	33
Patrick R. Grey	-	Civil	ED-L	Designer	11
Mike Danielson	-	Civil	ED-SC	Cost	15
Bich Quach	E.I.	Civil	ED-F	Geotechnical	7
Kelly Danton	-	Civil	ED-F	Geotechnical	10
Louis Britsch	P.G.	Geology	ED-F	Geology/Geomorphology	27
Cameron Alexander	-	Hydrology	ED-H	H&H	4
Sean Mickal	-	Civil	PD-P	Plan Formulation	-
Matt Mallard	-	Biology	PDR-RS	Environmental	12
Daniel Sumerall	-	Biology	PDR-RS	Environmental	5
	-	Geography	ED-SE	GIS	4
Gaynell Morrison	-	Civil	ED-SR	Relocations	10
Ulysses Hester	-	Civil	ED-SC	Specifications	25
Robert Culberson		Civil	ED-SC	Specifications	
Anthony Lauto	-	Civil	CD-Q	Construction	8
Stephen Pfeffer	-	Biology	OD-S	Operations	8
Anedra Baldwin	-	-	RE-A	Real Estate	-
Aven Bruser	-	-	OC	Counsel	-
Sandra Stiles	-	-	CT-W	Contracting	8
Andrea Baldwin			RE-E	Real Estate	4
Laura Wilkinson	-	Biology	HPO	Environmental	11
Maurya Kilroy	LSBA	Legal	OC	Asst. District Counsel	21

Table 1: Project Delivery Team

4. References & Criteria Wavier Approvals

There were no criteria waivers for the contracts included herein. All standard

regulations and design principles apply, many of which are listed below.

- EC 1165-2-209, Civil Works Review Policy (31 Jan 2010)
- ER 11-1-321, Army Programs Value Engineering (28 Feb 2005)
- ER 1110-1-12, Quality Management (21 July 90)
- ER 1110-1-1300, Engineering and Design Cost Engineering Policy and General Requirements (26 Mar 93)
- ER 1110-2-1302, Civil Works Cost Engineering
- EM 1110-2-1902, Slope Stability, (Oct 03)
- EM 1110-2-1913, Design and Construction of Levees (Apr 03)
- EM 1110-2-5027. Confined Disposal of Dredged Material
- ER 1110-2-1150, Engineering and Design for Civil Works Projects (31 August 1999)
- ER 1110-1-12, Quality Management (21 July 2006)
- EM 1110-2-5025, Dredging and Dredged Material Disposal (25 March 1983)
- EM 1110-2-5026, Beneficial Uses of Dredged Material (30Jun 1987)

Vertical Datums

- The establishment and use of vertical datums in the design work will follow the guidance provided in EC 1110-2-6070, Guidance for a Comprehensive Evaluation of Vertical Datums on Flood Control, Shore Protection, Hurricane Protection and Navigation Projects (01 July 2009).
- All surveys shall be conducted in accordance with CEMVN-ED-SS-06-01
- “USACE New Orleans Engineer District Guide for Minimum Survey Standards for Performing Hydrographic, Topographic and Geodetic Surveys.” The guidance is available at <http://www.mvn.usace.army.mil/ed/edss/index.asp>
- “USACE New Orleans Engineer District Guide for Minimum Survey Standards for Performing Hydrographic, Topographic and Geodetic Surveys.” The guidance is available at <http://www.mvn.usace.army.mil/ed/edss/index.asp>

- All geospatial data shall contain metadata which defines the relationship between NAVD88 2006.81 and the local tidal datum (LMSL, MLLW, etc.) using the epoch 2006.81.
- Each construction contract prepared for execution in this project shall reference a minimum of three (3) Permanent Bench Marks (PBM). Ideally these PBMs shall be located in the middle and at the end of the project. All surveys shall tie into a minimum of three benchmarks to determine the reliability of the project's control.
- Information relating to the location and determination of elevations of all vertical datums used in the project design will be provided to the Corps of Engineers, in the form of a Survey Documentation Report, for review and validation.

5. Engineering Studies, Investigations, and Design

5.1 Project Features. Location and site plan.

The project consists of three marsh creation areas, Bayou Sauvage Floodside Site 4 (BSFS-4), Bayou Sauvage Floodside Site 5 (BSFS-5) and Turtle Bayou North. This DDR will only cover BSFS-4 and BSFS-5. The BSFS-4 and BSFS-5 marsh restoration areas are located in the far south-eastern lobe of Lake Pontchartrain, east of Interstate 10. BSFS-4 and BSFS-5 consists of two areas of open water/broken marsh, which would be filled and/or restored to provide a healthy marsh platform. Both areas are within the existing marsh environment, at an adequate distance from the lake shoreline so that shoreline hardening for marsh protection is not considered warranted. The BSFS-4, BSFS-5, and Turtle Bayou north project locations are shown in Figure 2 of Appendix A.

5.2 Hydrology

The Bayou Sauvage Brackish Marsh Restoration Project used the results from the Rigolets gage. Based upon 6330 usable records taken between 19FEB1993 to 31DEC2005, the minimum stage is -2.48 feet, the average stage is +0.6 feet, and the maximum stage is +6.66 feet.

Tidal data to be used for Bayou Sauvage Brackish Marsh was calculated from the USACE #85700 Rigolets hourly adjusted gage readings, located in the at HWY 90 near Slidell, LA at the mouth of Lake Pontchartrain. Since this is nearest the mitigation site, this gage is an ideal choice to be used for this project. This gage and this project are both near the Slidell area and subject to tidal influences from the Gulf of Mexico.

Using Tidal Data terminology from NOAA, the results of the Rigolets gage are as follows:

MHW & MHHW = 1.013 feet NAVD88 (2006.81)

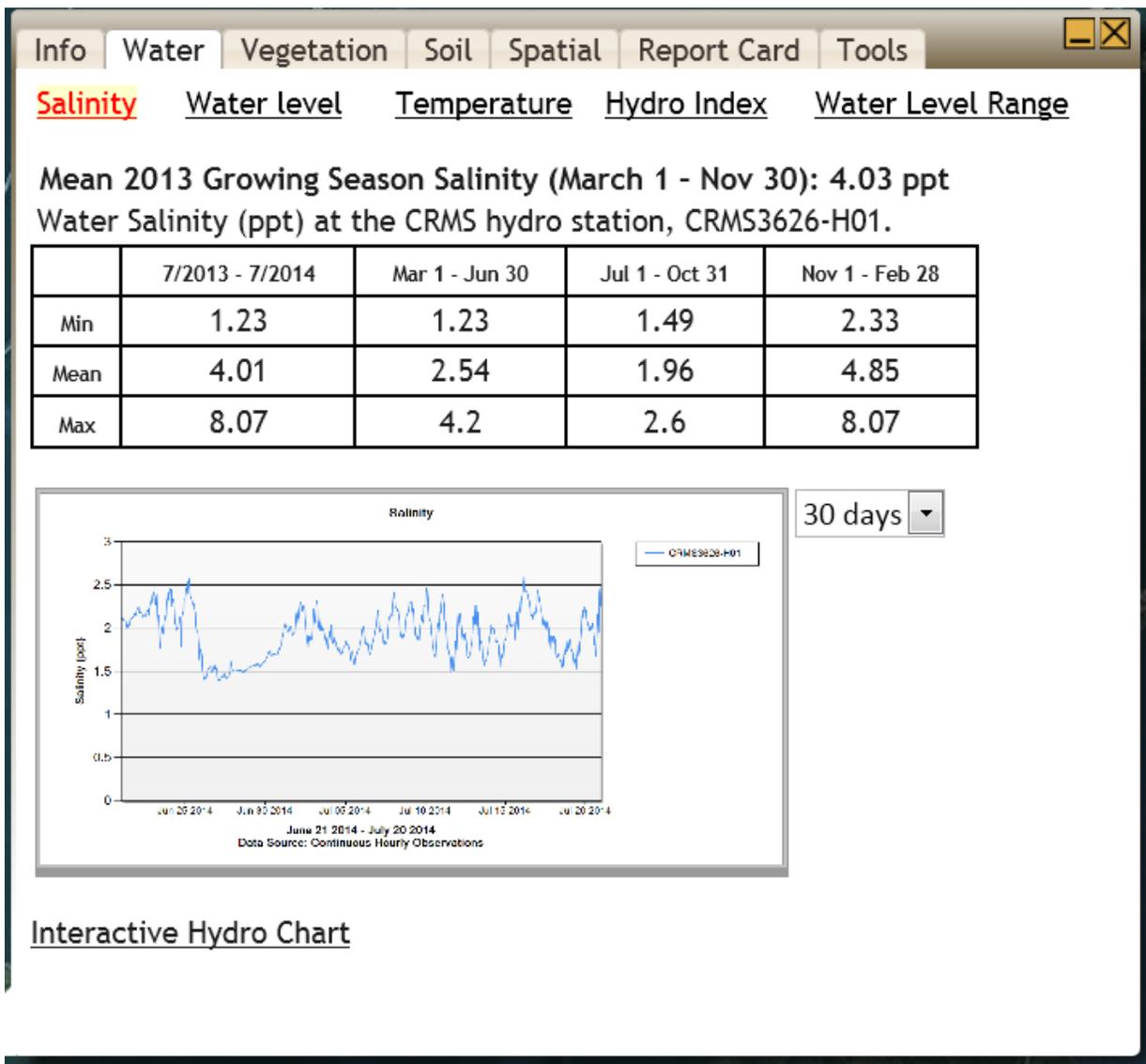
MSL & MTL = 0.60 feet NAVD88 (2006.81)

MLW & MLLW = 0.1830 feet NAVD88 2006.81

Due to Relative Sea Level Rise (RSLR), water surface elevations in the project area could increase by up to the following amounts by the end of the project's 50 year project life: 1.23 feet for the Low estimate, 1.66 feet for the Intermediate estimate, and 3.06 feet for the High estimate.

Salinity

The salinity ranges from 1.23 to 8.07 ppt at CRMS3626, based for the period from July 2013 to July 2014. The mean salinity for this area is 4.01 ppt.



Graph 1: Water Salinity Range – CRMS3626-H01 2014

5.3 Placement of Dredged Material

Excavation and placement of dredged material will be performed with a hydraulic cutterhead dredge. It is anticipated that dredge size for completion of this work could range from a 20 inch to a 30 inch dredge. Throttling down of a larger dredge may be required to maintain required freeboard elevations and assure retention of dredged material. The material will be moved through a combination of floating and shore discharge pipeline between the borrow area and the BSFS-4 and BSFS-5 marsh creation areas.

5.4 Geotechnical Investigations

The geotechnical appendix, Appendix C, addresses the subsurface exploration, soil testing, settlement calculations of the BLH-Wet and marsh creation areas and slope stability analyses of the retention dikes.

5.5 Civil Design

5.5.1 SURVEYS – RESTORATION SITES, ACCESS AND LAKE BORROW AREAS

General: Two separate surveys were taken for BSFS-4 and BSFS-5. BSFS-4 surveys include the proposed borrow site in Lake Pontchartrain.

BSFS-4: The survey data for BSFS-4 marsh creation area and the borrow site was taken in July and August 2012 by EMC Inc., Job number 12-054C, task 0028. The entire survey report is available in Appendix B. This survey consisted of:

- Eleven (11) hydrographic cross-sections of the borrow Site
- Fourteen (14) long overbank/hydrographic combo cross-sections. Four (4) of which were for BSFS-4
- Thirty two (32) short overbank/hydrographic combo cross-sections. Three (3) of which were for BSFS-4.

BSFS-5: The survey data for BSFS-5 marsh creation area was taken in September 2013 by EMC Inc., Job number 13-155C, task 48. The entire survey report is available in Appendix B. This survey consisted of:

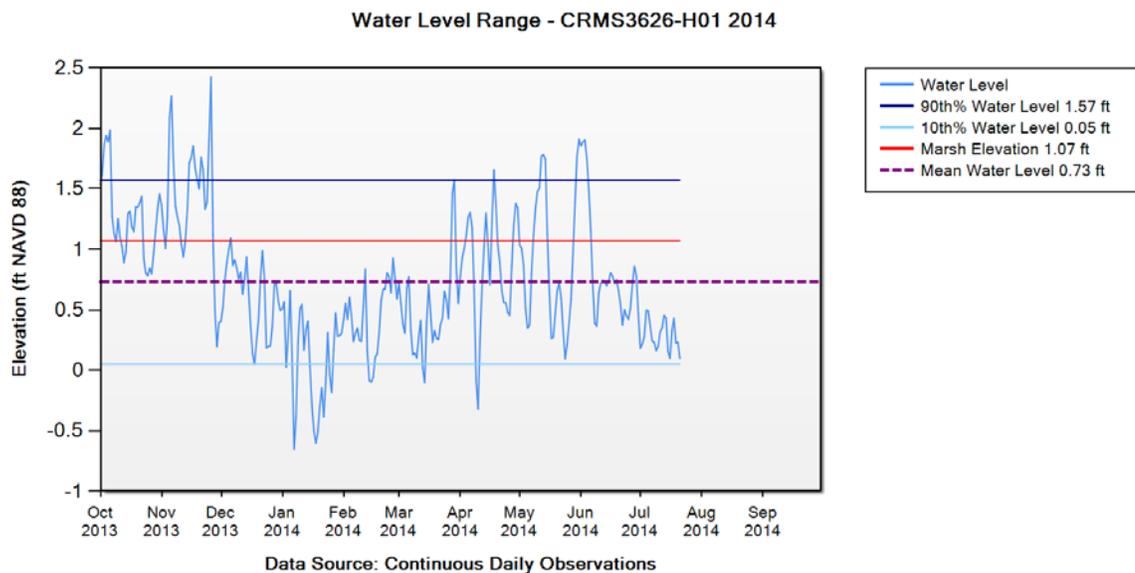
- Nine (9) overbank/hydrographic cross-sections of the marsh creation area.
- Three (3) profiles of the access channels

5.5.2 MARSH CREATION

MARSH ELEVATION DETERMINATIONS

Probably the most important determination in the design of marsh creation projects is the desired height of the final marsh platform. This target elevation is required to subsequently determine dredge quantities, retention dike heights, anticipated settlement, contract durations, and multiple other design parameters. To determine the target elevation, five considerations are taken into account. The considerations are as follows:

- Water Elevations:** Data from the Rigolets gage is provided under the Hydrology paragraph of this DDR. For the purposes of determining the target marsh elevation, data provided by the Coastwide Reference Monitoring System (CRMS) is more suited for this project. CRMS Station 3626 is approximately 1.0 miles from the marsh creation site and outside of the levee protection. Data for the water level range provided by CRMS3626 provides water levels from Oct. 2013 to Sep. 2014. The mean water elevation for this time period is 0.73'. The 90th % water level is +1.57, and the 10th % water level is 0.05'.



Graph 2: Water Level Range – CRMS3626-H01 2014

- Project Surveys:** Existing marsh elevations within the project footprint per USACE surveys are in the range of +0.5' to +1.0' NAVD88 2006.81. Although the elevations stated are representative of the current marsh elevations with the project footprint, it is understood that these elevation are not necessarily healthy marsh elevations.
- CRMS Data:** Three CRMS stations located in the general vicinity of the project were used in the consideration of the target marsh elevation. CRMS 3626 is located approximately 1.0 miles from the marsh creation sites and within Bayou Chevee. This station provides the ideal data to use in the consideration of the marsh creation area target elevation. Although the elevation of the marsh at this station is +1.07', this elevation may not represent an idea marsh elevation for healthy marsh. See Figure 3 in Appendix A for the three local CRMS stations used to assist in

determining the target marsh elevation. See Appendix B for CRMS3636 Survey Report.

- Environmental Input: Input from the USACE Environmental staff indicated that an ideal water inundation of the marsh would be in the range of 10% to 25% per duration of time, and the marsh at the CRMS3626 appears to be healthy marsh.
- Other Agencies Input: The 65% design for this project will be review by other agencies for input on the final marsh target elevation.

At a 65% level of design, an elevation of +1.0' NAVD88 2006.81 was determined to be the target marsh elevation. An elevation of +1.0' would provide the same marsh elevation as shown in the data of CRMS 3626 and the highest marsh elevation within the project surveys. This target elevation would be above the mean water elevation and in the approximate range of 41% of inundation.

Consideration needs to be taken into account of the project life of 50 years. As indicated under the Environmental Input for determining the target elevation, an inundation range of 10% to 25% would be ideal. As indicated in Graph 1, an elevation of 1.57' would provide a 10% inundation but may result in tree growth within the first few years. Furthermore the datum used in the CRMS data and what was used in the project surveys is being reviewed to determine the elevation differences. Final consideration for the target marsh elevation will be concluded after future input from the other agencies.

FILL MATERIAL

In order to determine the physical characteristics and behavior of the soils associated with the BSFS-4 and BSFS-5 marsh creation features, geotechnical investigations and analyses were performed. FFEBJV, LLC collected soil borings and performed laboratory tests to determine soil characteristics. Ten (10) general borings (BSFS-1G through BSFS-10G) were taken to a depth of 25' in the proposed lake borrow area. Refer to the Appendix D for the complete geotechnical report for full details.

IN SITU FOUNDATION MATERIALS

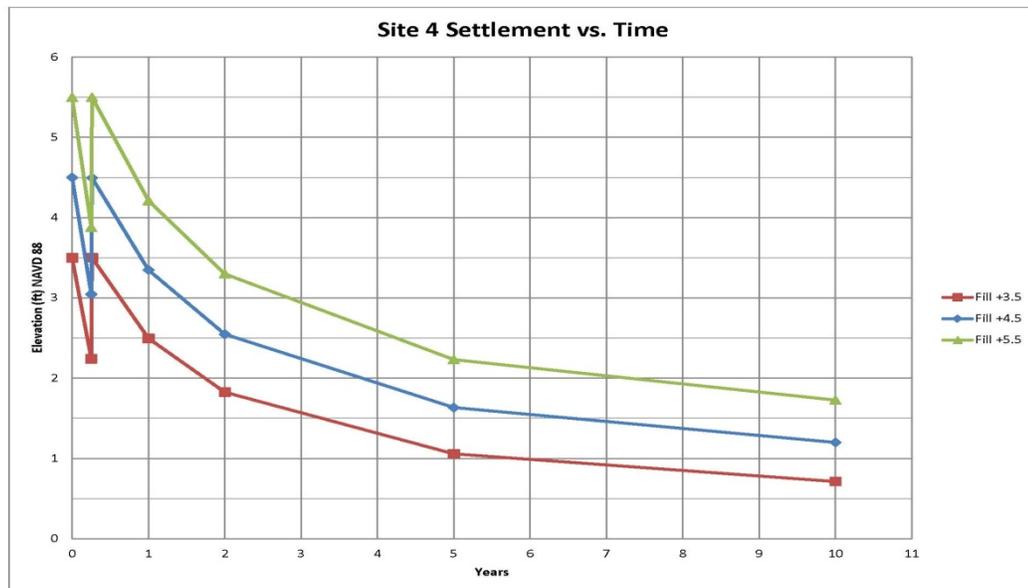
In order to determine the physical characteristics and behavior of the soils associated with the BSFS-4 and BSFS-5 marsh creation features, geotechnical investigations and analyses were performed. FFEBJV, LLC collected soil borings and performed laboratory tests to determine soil characteristics. Within BSFS-4, two (2) undisturbed soil borings (BSFR-12U and BSFR-13U) were taken. Within BSFS-5, three (3) undisturbed soil borings (BSFS-1U, BSFS-2U, and BSFS-3U) were taken. Refer to the Appendix D for the complete geotechnical report for full details.

SETTLEMENT ANALYSIS

To account for settlement for the primary consolidation of the foundation of the BSFS-4 and BSFS-5 marsh creation areas due to the weight of dredged material, a settlement analysis was

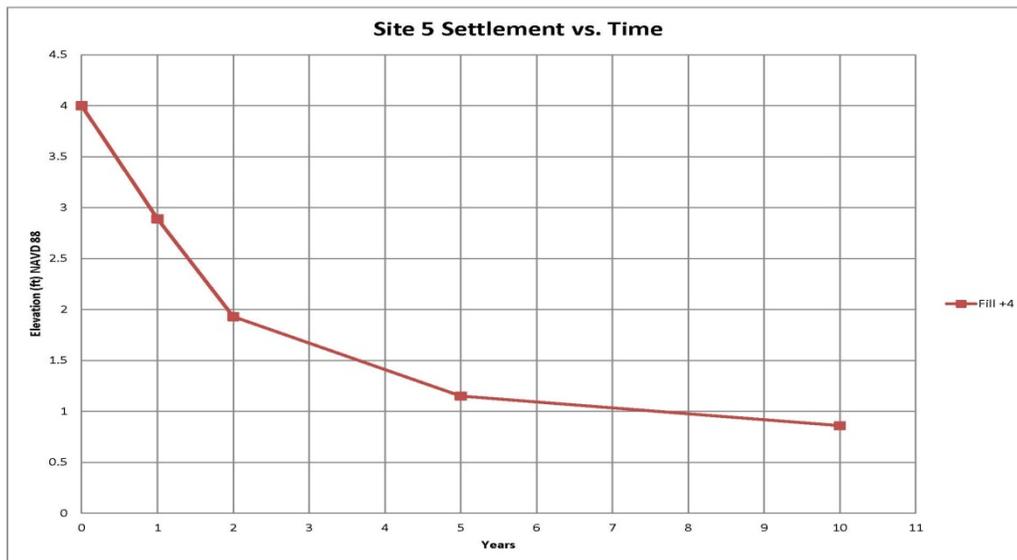
conducted at various fill elevations. Refer to the Geotechnical Soils report in Appendix D for complete detailed information.

Settlement curves for the BSFS-4 marsh creation area, with initial dredged fill elevations at +3.5', +4.5', and +5.5' (NAVD88 2006.81) were developed and shown in Graph 3 below. This settlement curve includes the result of 2 lifts; second lift will be within 2 months.



Graph 3: BSFS-4 Marsh Settlement Curve

Settlement curves for the BSFS-5 marsh creation area, with initial dredged fill elevation +4.0' NAVD88 (2006.81) was developed and shown below in Graph 4 below.



Graph 4: BSFS-5 Marsh Settlement Curve

FILL ELEVATIONS

Based on the desired BLH-Wet and marsh target elevations and the respective settlement curves, the final dredge fill elevations are as follows:

BSFS-4 Marsh Fill Elevation: To reach a target elevation of +1.0' NAVD88 (2006.81) for the BSFS-4 marsh creation area, the required fill elevation will be +3.5' NAVD88 (2006.81).

BSFS-5 Marsh Fill Elevation: To reach a target elevation of +1.0' NAVD88 (2006.81) for the BSFS-5 marsh creation area, the required fill elevation will be +4.0' NAVD88 (2006.81).

RETENTION DIKES

BSFS-4 Retention Dike: A retention dike for BSFS-4 will be constructed to elevation +4.5' NAVD88 (2006.81) to provide 1' of freeboard above the required fill elevation of 3.5'.

BSFS-5 Retention Dike: A retention dike for BSFS-5 will be constructed to elevation +5.0' NAVD88 (2006.81) to provide 1' of freeboard above the required fill elevation of +4.0'.

BSFS-5 Cross Dike: A cross dike for BSFS-5 will be constructed to elevation 3.5' NAVD88 (2006.81) to allow effluent discharge of dredge fill from the deeper section of

BSFS-5 along the northern area of the marsh creation area into the shallower area of the southern marsh creation area.

Typical sections of the retention dikes are shown in Appendix D in the geotech report, and are based on slope stability analysis conducted in the geotech report. Borrow for the retention dike will come from adjacent borrow within the BLH-Wet and marsh creation areas.

QUANTITIES

Borrow: Borrow quantities were calculated using the average end method. Cross sections were developed in InRoads using the survey data of the borrow site and the proposed dredge depths of the borrow site. The borrow site is approximately 459 acres. The total amount of fill material from the borrow site is approximately 7,860,000 cubic yards.

Retention Dikes: The required fill quantities for the retention dikes are as follows:

BSFS-4 dike – 200,000 cubic yards.

BSFS-5 dike – 500,000 cubic yards.

BSFS-4 Creation Area: The neatline quantities for the BSFS-4 marsh creation area were calculated using the average end method. Cross sections were developed in InRoads using the survey data of the existing marsh, retention dikes in place, and the proposed required fill elevation. Additional quantity was added to the neatline quantity to account for 4' of poor foundation material which included 40% of the of the foundation area to a depth 4 more feet. Then the quantity of the interior borrow that was excavated for the retention dike was added for the final dredging quantity required for BSFS-4. See Appendix C for the BSFS-4 quantity calculations. The final required fill material for the BSFS-4 marsh creation area was estimated to be 800,000 cubic yards.

BSFS-5 Marsh Creation Area: The neatline quantities for the BSFS-5 marsh creation area were calculated using the average end method. Cross sections were developed in InRoads using the survey data of the existing marsh, retention dikes in place, and the proposed required fill elevation. Additional quantity was added to the neatline quantity to account for 8' of poor foundation material which included 60% of the of the foundation area to a depth 8 more feet. Then the quantity of the interior borrow that was excavated for the retention dike was added for the final dredging quantity required for BSFS-5. See Appendix C for the BSFS-5 quantity calculations. The final required fill material for the BSFS-5 marsh creation area was estimated to be 4,500,000 cubic yards

FUTURE REQUIREMENTS

Future requirements will be provided in the 95% review.

5.6 Real Estate Determination and Acquisitions

To be provided at 95% design.

5.7 Relocations

A field investigation was executed for each of the BSFS-4 and BSFS-5 marsh creation areas. No required relocations are required. The databases used to identify potential pipelines, power lines and transmission lines within the area of the projects were HTSI, DNR SONRIS GIS, NPMS-LA, USDOT, Homeland Security Infrastructures Program 2012 and NOAA.

6. Implementation of Lessons Learned

The Lessons Learned Memo will be included at the final submittal.

7. Cost Estimates

7.1 Independent Government Estimate (IGE)

The IGE was prepared using the following criteria,

- The cost estimates for the mitigation sites were prepared utilizing MII Software, the Cost Engineering Dredge Estimating Program (CEDEP) dredge estimating program, and unit pricing. The estimated costs were based upon an analysis of each line item evaluating quantity, production rate, and time, together with the appropriate equipment, labor and material costs. All of the construction work is common to the CEMVN. In addition, all labor, equipment and materials are typical of this type of construction and are currently available.
- Lands and damages were calculated by CEMVN Real Estate Division. The real estate costs also include administrative and acquisitions costs for building the mitigation features.
- Assumes there are no relocations required for this project.
- Quantities were provided by CEMVN Engineering Division (Civil Branch).
- This estimate assumes that the contractor will be working 10 hours days for land work and 24 hours a day for dredging work, seven (7) days a week. Equipment rates were taken from the USACE EP-1110-1-8, Region III, 2009.
- Labor rates were based on historical rates taken from contractor payrolls for local jobs. All material prices were based on quotes received from suppliers with local sales tax applied.

- The Engineering and Design (E&D) percentage rate includes such costs as project management, engineering, planning, designs, investigations, studies, reviews, value engineering and engineering during construction (EDC). A percentage of 6% was used in most cases because the type of work is typical to the New Orleans District for this type of work.
- The Supervisory and Administration (S&A) rates for USACE civil works districts historically range between 7.5% and 10%. A percentage of 8% within the historical range was selected.
- Field office overhead is included in the operating cost of the dredge.
- Home office overhead was based on 15% which is within the historical range used by New Orleans District.
- Profit was calculated by the Weighted Guidelines Method.
- Bond was assumed to be 1%. A contingency rate of 25% was developed by first looking at the recommended rate of 20% for feasibility level studies over \$10,000,000 as shown in ER 1110-2-1302 and then looking at the various high risk issues.
- Contingencies for the mitigation projects include problems higher than expected settlement or erosion, damaging weather events during the construction phase of the project, dredge market conditions and fuel prices.
- The operations and maintenance estimates were developed using unit costs from historical bid data and information provided by the Environmental office.

7.2 MCACES Updates

At this time MCACES updates will be provided for review under separate cover. After award of the project the MCACES updates will be included in Appendix E.

8. Technical Review Documentation

Technical review documentation shall be included as an appendix in the DDR. A copy of the Statement of Technical and Legal Review for the design and P&S shall be included in the DDR. The documentation from the ATR team required by the QCP may be either included or referenced in the DDR.

Review Type	Key Point	Decision	Date of Review	Documentation Available
-------------	-----------	----------	----------------	-------------------------

Project Delivery Team (PDT) Review		14 Nov 2014	
District Quality Control (DQC) Review		14 Nov 2014	
Agency Technical Review (ATR)		14 Nov 2014	
Bid ability, Constructability, Operability & Environmental Review (BCOE) Certification Letter		TBD	
Statement of Technical & Legal Review		TBD	

Table 2: Review Documentation

9. APPENDICES

APPENDIX A

FIGURES

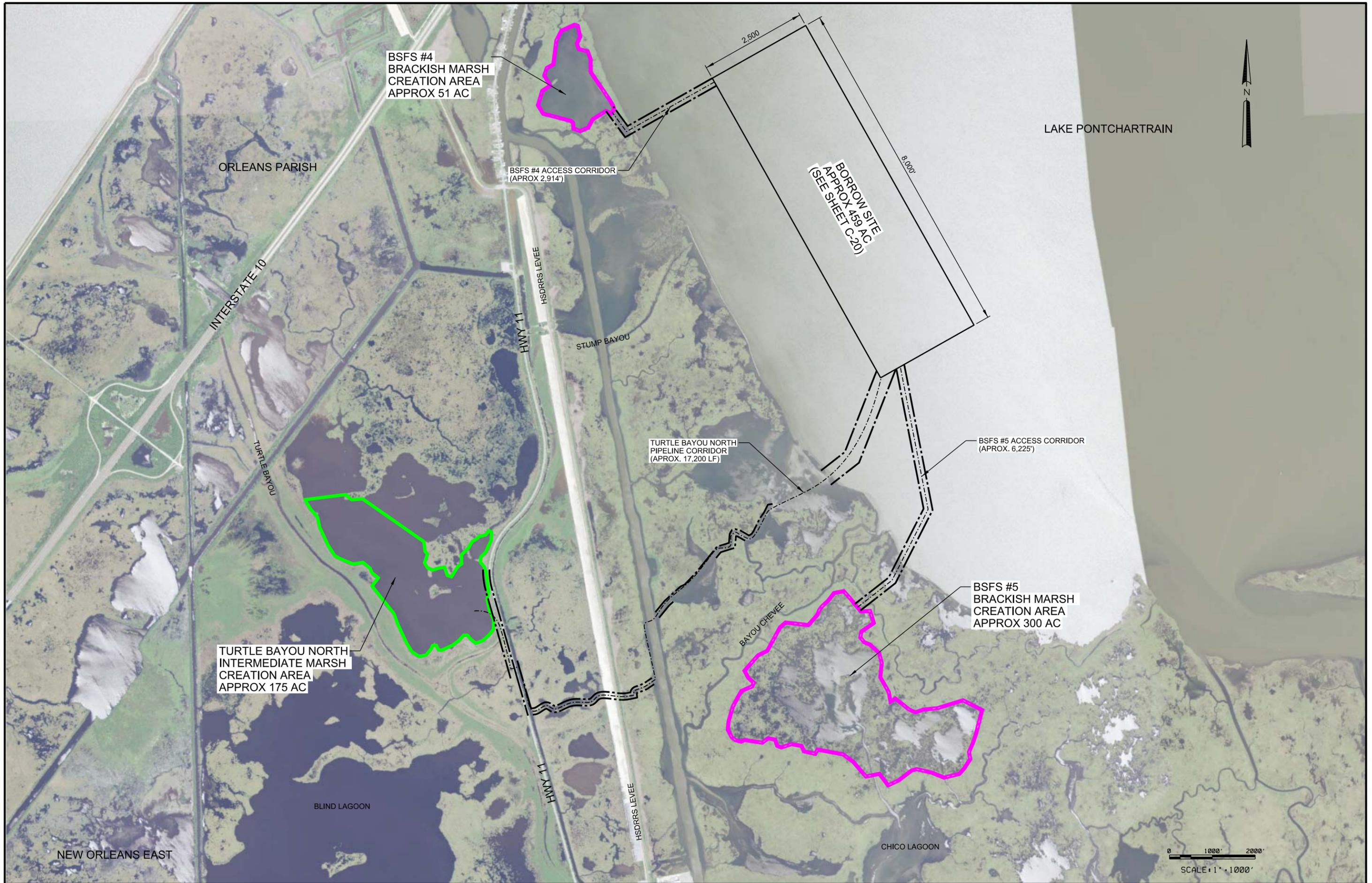


FIGURE 1 - OVERALL MARSH CREATION PLAN

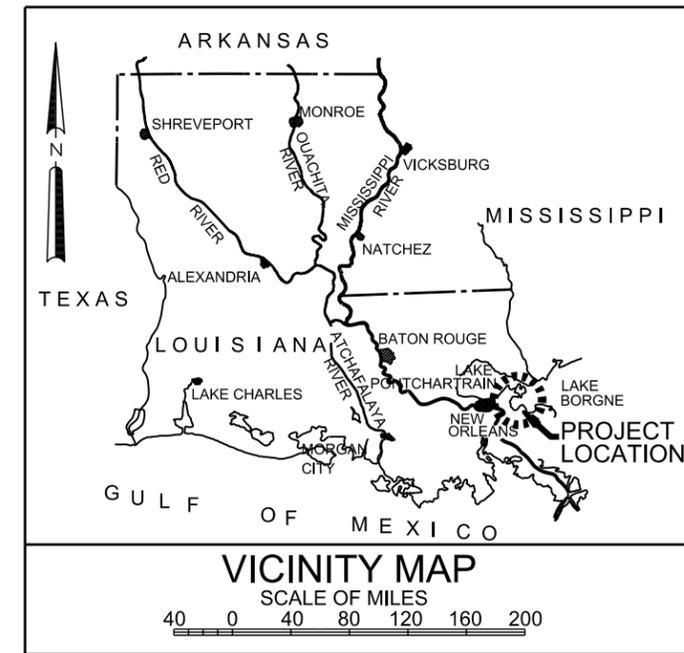
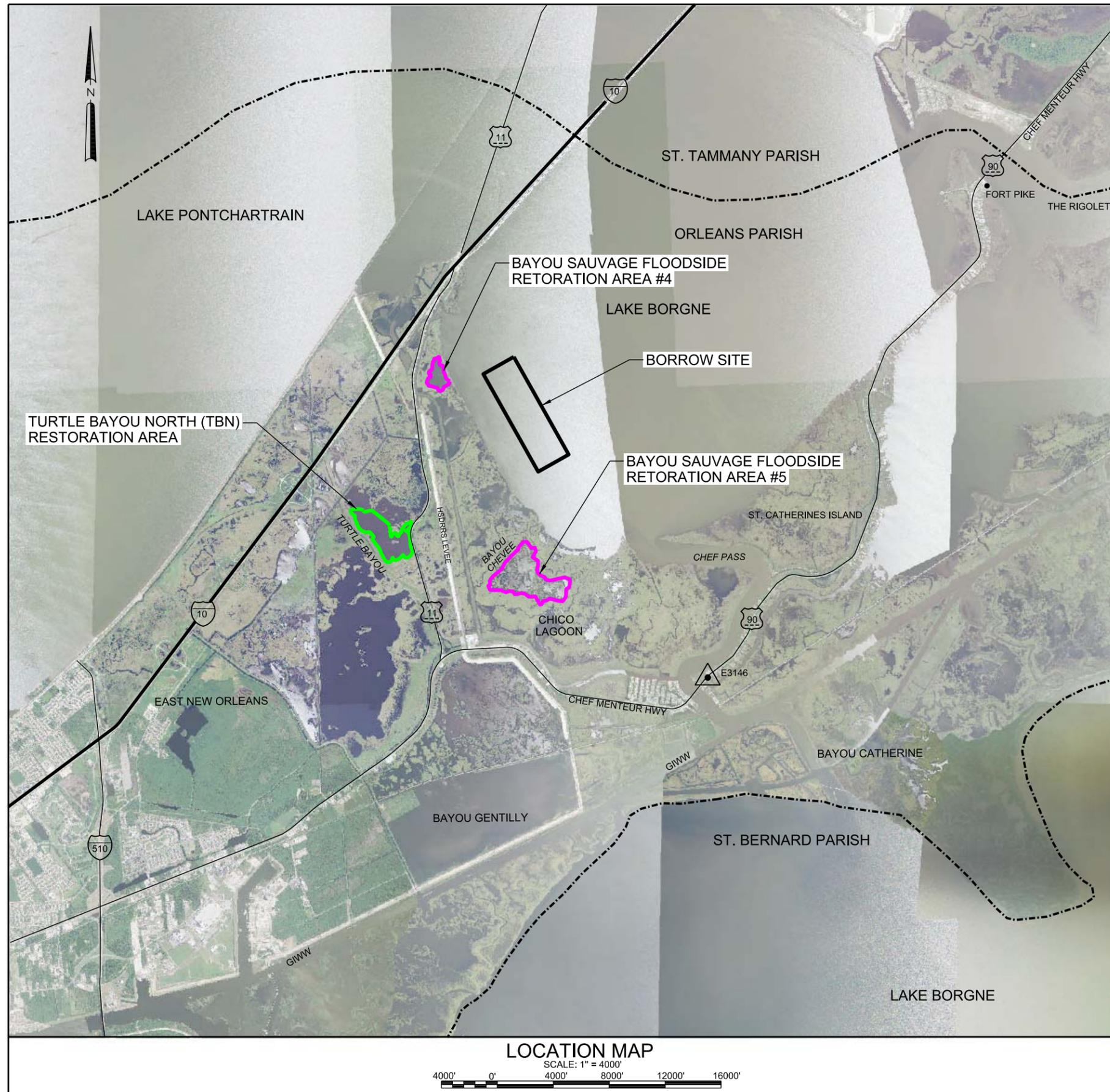


FIGURE 1- PROJECT LOCATION AND VICINITY MAP



FIGURE 3 - CRMS STATIONS

APPENDIX B

SURVEY REPORTS

Elevation and Control Survey Report

For

Coastal Reference Monitoring System –Wetlands Project

**TASK 6
CRMS 3626**

Prepared For

Coastal Estuary Services, LLC.



Prepared By



JUNE 2007

Station ID	Easting _UTM,NAD83 (m)	Northing _UTM,NAD83 (m)
CRMS3626	803153.428	3334876.547

SECTION 1

METHODOLOGY REPORT

DESCRIPTION

This report details the procedures followed by T. Baker Smith, Inc. to provide the Louisiana Department of Natural Resources (LDNR) with required survey data on the establishment of the RSET rod, existing marsh elevations for the project area, installation of temporary benchmark and installation of staff gage to be used in conjunction with data Sonde located on the Site CRMS 3626.

LOCATION

Approximately 2.2 miles west of the point of entry of Chef Menteur Pass into Lake Pontchartrain, in Orleans Parish, LA.

PLANNING AND LAYOUT OF THE GPS SURVEY

This Scope of Services involves RTK (real-time kinematic) survey. The purposes of the survey are as follows:

1. To establish RSET rod and supporting survey data.
2. To establish existing marsh elevation.
3. To establish staff gauge and TBM.

DATA COLLECTION AND PROCESSING

The equipment that was used on this project was a Trimble 5700 RTK base station with a Trimble 5800 rover unit. The data was stored in a Trimble TSC-II data collector. All Survey data was recorded in Louisiana South Zone (1702) NAD 83 feet and NAVD feet. The RTK base station was setup over Secondary Monument (PO16-SM-02) and used to transmit real time corrections to the rover unit were the points were collected and stored in the data collector. At the end of the survey the data was downloaded and processed through TGO (Trimble Geomatics Office) software. Once the survey data was downloaded into TGO and processed it was exported into a text format. The survey data was then converted into UTM NAD 83 meters using CORPSCON. The survey was begun on June 14, 2007 by W. Beetz (Party Chief) and J. Fusilier (Instrument man). The survey was completed on June 14, 2007 by the same personnel.

QUALITY ASSURANCE PROCEDURES

Using the Secondary Monument (PO16-SM-02), which was provided by LDNR, a second point (TBM) was established using conventional survey methods. This point was used as a check point. Once the RTK unit was setup the TBM was tied into to verify that the equipment was working properly. At the end of the survey the TBM was rechecked in order to verify that the data being collected was correct.

Station: CRMS3626
Date: 6/14/2007
Staff Gage Reading: 0.84 ft
Marsh Flooded: NO
Time: 11:52:25

Point Number	Northing (UTM_NAD83_Meters)	Easting (UTM_NAD83_Meters)	Elevation (NAVD88_FEET)	Notes
13525	3334921.36	803225.012	1.037	SURFACE
13526	3334921.505	803225.019	1.14	CROWN
13527	3334918.185	803219.219	0.881	SURFACE
13528	3334918.101	803219.241	1.213	CROWN
13529	3334913.477	803214.06	0.692	SURFACE
13530	3334913.549	803214.293	1.408	CROWN
13531	3334909.862	803209.849	0.931	SURFACE
13532	3334909.757	803210.053	0.938	CROWN
13533	3334906.383	803204.849	0.932	SURFACE
13534	3334906.354	803204.886	1.597	CROWN
13535	3334903.733	803201.588	1.069	SURFACE
13536	3334905.004	803202.846	1.377	CROWN
13537	3334901.155	803196.886	1.176	SURFACE
13538	3334900.955	803197.146	1.388	CROWN
13539	3334894.22	803188.872	1.294	SURFACE
13540	3334894.203	803189.124	1.473	CROWN
13541	3334890.022	803184.945	0.81	SURFACE
13542	3334889.764	803184.967	1.267	CROWN
13543	3334885.004	803181.484	0.701	SURFACE
13544	3334884.967	803181.465	0.661	CROWN
13545	3334881.879	803176.922	0.415	SURFACE
13546	3334881.793	803177.396	1.173	CROWN
13547	3334878.098	803172.938	0.676	SURFACE
13548	3334877.793	803173.155	1.283	CROWN
13549	3334872.289	803171.464	1.387	SURFACE
13550	3334872.288	803171.442	1.394	SURFACE
13551	3334872.126	803171.507	1.466	CROWN
13552	3334868.388	803167.812	0.527	SURFACE
13553	3334868.549	803167.671	1.176	CROWN
13554	3334865.202	803164.475	0.835	SURFACE
13555	3334865.173	803164.395	1.052	CROWN
13556	3334860.908	803160.579	0.935	SURFACE
13557	3334860.709	803160.526	0.934	CROWN
13558	3334856.581	803158.11	0.553	SURFACE
13559	3334856.848	803158.018	1.13	CROWN
13560	3334853.385	803152.949	0.894	SURFACE
13561	3334853.62	803153.044	1.351	CROWN
13562	3334849.135	803149.207	0.865	SURFACE
13563	3334849.311	803149.325	1.117	CROWN
13564	3334845.976	803146.25	1.092	SURFACE
13565	3334846.032	803146.314	1.592	CROWN
AVERAGE MARSH ELEVATION			1.069	

Continuous Recorder and Staff Gauge Survey Data Sheet

		Continuous Recorder Gauge				
Station	Date	Top of Recorder Support Pole (4x4 Post, Cap of Pipe, etc.) (NAVD 88, FT.)	Top of Support Pole to Nail or Top of 1/4" Hole (Ft.)	Nail or Hole Elevation (NAVD 88, Ft.)	Top of Recorder Support Pole to Top of Water Distance (Ft.)	Water Elevation (NAVD 88, Ft.)
CRMS3626-CR-H01	6/14/07	5.37	1.70	3.67	4.54	0.83

How to Obtain Readings for Each Continuous Recorder Gauge Column

Top of Recorder Support Pole: Obtained by using department approved surveying methods.
Top of Support Pole to Nail or 1/4" Hole: Obtained by physically measuring the distance between the two points.
Nail or Hole Elevation: Obtained by using the formula subtracting the two previous columns.
Top of Recorder Support Pole to Top of Water Distance: Obtained by measuring the distance between the two points.
Water Elevation: Obtained by using the formula: Top of Recorder Support Pole – Top of Recorder Support Pole to Top of Water Distance.

		Staff Gauge						
Station	Date	Existing Staff Gauge Reading (Upon Arrival)	Top of Staff Gauge Support Pole (NAVD 88, Ft.)	Top of Staff Gauge Support Pole to Top of Water Distance (Ft.)	Water Elevation (NAVD 88, Ft.)	Staff Gauge Reading (After Establishment or Adjustment) (NAVD 88, Ft.)	Computed Difference (Water Elevation vs. Staff Gauge)	Correction Factor
CRMS3626-SG-H01	6/14/07		5.89	5.02	0.87	0.84	0.03	

How to Obtain Readings for Each Staff Gauge Column

Existing Staff Gauge Reading: If a staff gauge is present at this location, obtain a reading before any adjustments are made.
Top of Staff Gauge Support Pole: Obtained by using department approved surveying methods.
Water Elevation: Obtained by subtracting the two previous readings (Top of Staff Gauge)Support Pole and Top of Staff Gauge Support Pole to Top of Water Distance.
Staff Gauge Reading: Obtained by reading the staff gauge after it has been sent to the datum.
Computed Difference: Obtained by subtracting the two previous readings (after elevation and Staff Gauge Reading)
Correction Factor: Obtained by subtracting the Existing Staff Gauge Reading and the Staff Gauge Reading. The correction factor is used to correct all previously data collected.



VICINITY MAP: Scale: 1" = 1000'

REPRODUCED FROM 2004 CHEF MENTEUR NW DOQQ

Station Name: CRMS3626-E01

Location: Approximately 2.2 miles west of the point of entry of Chef Menteur Pass into Lake Pontchartrain, in Orleans Parish, LA.

Monument Description: 9/16" stainless steel rod driven to refusal in a 6" PVC sleeve. Number of rods used: 20
Total Rod Length: 78.65 feet. Top of collar to top of rod distance: 0.50 feet.

Date Of Survey: 6-14-07

Monument Established By: T. Baker Smith, Inc.

Deep Rod RSET

NAD 83 Geodetic Position:
Lat. 30°06'27.06"N
Long. 89°51'15.13"W

UTM, NAD 83, Meters (Zone 15) Coordinates
N= 3334876.547
E= 803153.428

NAD 83 Datum LSZ (1702) Feet
N= 587611.142
E= 3748507.500

Elevation at Top of Rod (NAVD 88)
2.95 feet



*Position Determined by using Real-Time Kinematic (RTK) survey from Secondary GPS Monument "PO16-SM-02"
Approximate coordinates of RSET monument were obtained by T. Baker Smith, Inc. using autonomous positioning techniques with RTK equipment.*



VICINITY MAP: Scale: 1" = 1000'

REPRODUCED FROM 2004 CHEF MENTEUR NW DOQQ

Station Name: CRMS3626-CR-H01

Location: Approximately 2.2 miles west of the point of entry of Chef Menteur Pass into Lake Pontchartrain, in Orleans Parish, LA.

Gauge Description: The gauge is a continuous recorder gauge attached to a 4" x 4" treated wood post with reference nail driven horizontally into the wood post.

Date Of Survey: 6-14-07

Continuous Recorder Gauge

NAD 83 Geodetic Position:

Lat. 30°06'28.20"N
Long. 89°51'14.69"W

UTM, NAD 83, Meters (Zone 15) Coordinates

N= 3334911.926
E= 803164.303

NAD 83 Datum LSZ (1702) Feet

N= 587726.585
E= 3748544.844

Elevation at Top of 4" x 4" Post (NAVD 88)

5.37 feet

Elevation at Top Shank of Nail (NAVD 88)

3.67 feet



*Position Determined by using Real-Time Kinematic (RTK) survey from Secondary GPS Monument "PO16-SM-02"
Position established by T. Baker Smith, Inc. for the Louisiana Department of Natural Resources Coastal Restoration Division.*



VICINITY MAP: Scale: 1" = 1000'

REPRODUCED FROM 2004 CHEF MENTEUR NW DOQQ

Station Name: CRMS3626-SG-H01

Location: Approximately 2.2 miles west of the point of entry of Chef Menteur Pass into Lake Pontchartrain, in Orleans Parish, LA.

Gauge Description: The gauge is a ceramic coated tide gauge attached to a 4" x 4" Treated Post.

Date Of Survey: 6-14-07

Staff Gauge

NAD 83 Geodetic Position:

Lat. 30°06'28.16"N
Long. 89°51'14.67"W

UTM, NAD 83, Meters (Zone 15) Coordinates

N= 3334910.637
E= 803164.804

NAD 83 Datum LSZ (1702) Feet

N= 587722.336
E= 3748546.425

Elevation at Top of 4" x 4" Post (NAVD 88)

5.90 feet



*Position Determined by using Real-Time Kinematic (RTK) survey from Secondary GPS Monument "PO16-SM-02"
Position established by T. Baker Smith, Inc. for the Louisiana Department of Natural Resources Coastal Restoration Division.*



VICINITY MAP Scale: N.T.S.

Reproduced from 1998 DOQQ Aerial Photos

Station Name: "PO16 SM 02"

Monument Location: Located at Bayou Sauvage, on the western protection levee in the southern section of Bayou Sauvage National Wildlife Refuge, Orleans Parish, Louisiana, immediately north of U.S. Highway 90 (Menteur Hwy). Monument is situated on the west side of a limestone driveway leading to a parking area and is 29 feet north of a drainage pipe and 2.7 feet beyond the center of wooden 6x6 barriers

Monument Description: NGS Style floating sleeve monument; 9/16" stainless steel rods driven 48 feet to refusal, set in a sand filled 6" PVC pipe with access cover set flush with the ground. Datum point is recessed 0.27 feet below access cover.

Stamping: H 374 ECC

Installation Date: 10/16/03 **Date of Survey:** October 2003

Monument Established By: John Chance Land Surveys, Inc.

For: LA Department of Natural Resources, CRD

Adjusted NAD 83 Geodetic Position

Lat. 30° 03' 10.516142"N
 Long. 89° 52' 49.507515"W

Adjusted NAD 83 Datum LSZ (1702) Ft

N= 567,651.85
 E= 3,740,470.81

Adjusted NAVD88 Height

Elevation = -2.42 feet (-0.738 mtrs)

Geoid99 Height = -26.384 mtrs.
 Ellipsoid Height = -27.123 mtrs.

*Adjusted CORS Height: -2.52 feet (-0.769 mtrs)
 Avg. of OPUS Solutions: -2.45 feet (-0.746 mtrs)*



CE-3
CRMS Site 3626

Base point (POLG-5M-02)

Base

13500 N. 567651.85

E. 3740470.81

Elev. -2.42

STA

T

HI

-

Elev.

2.22 5.30

-2.42

2.44

2.86

Loop Back

2.35

7.63

13501

Check

N. 567674.588

E. 3740508.636

Elev. 2.865

R-Set

13502

N. 587611.142

E. 3743507.500

Elev. 2.952

L. Reetz
J. Pashley

6-14-07

(52)

3628

CE3

CENS SITE 2626

SONDE

13504

N. 5877226.585

E. 3748544.844

Elev. 3.665 Ref. Nail

Gauge

N. 5877222.336

13516

E. 3748546.425

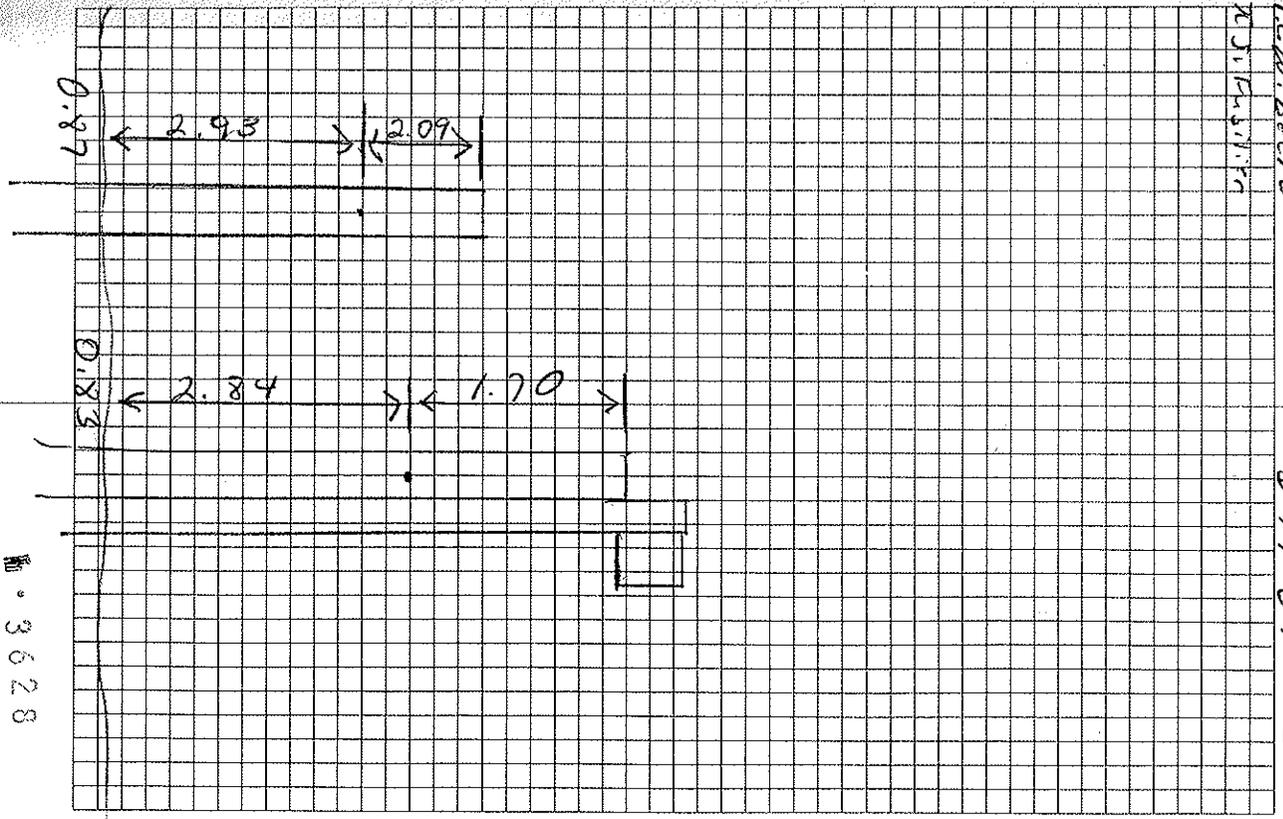
Elev. 3.80 Ref. Nail

Gauge set at .84 at 11:40 AM

PLM. Refs
N SITE 2626

6-14-07

(57)



Ref. 3628

LES

CRIMS SITE 36226

20 Rods

1.35' CUT

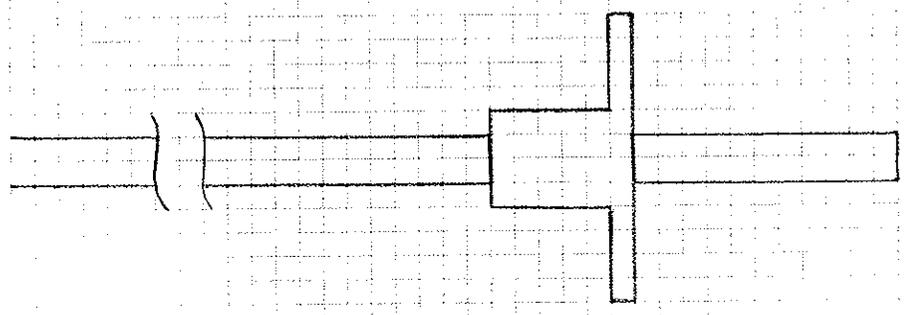
78.65' DEPTH

0.50' COLLAR

B LITTLE
J STEVENS
F LITTLE



6-1-07



666

1.35' 1.35'



US Army Corps
of Engineers®
New Orleans District

HSDRRS Lake Pontchartrain and Vicinity Mitigation Surveys Bayou Sauvage Flood Side Brackish Marsh Restoration

Contract # W912P8-10-D-0050

Survey Job: 12-054C

Task# 0028

New Orleans, Orleans Parish, LA

Survey Report



2472 Sunset Drive,
Grenada, MS 38901

(662) 226-5166

Mark Mattox

mattox@emcsurvey.com

I hereby certify that the work described in this survey report was performed under my supervision and that the results described and/or referenced herein are complete and correct to the best of my ability.



August 2, 2012

Table of Contents

[Section 1: General Project Description](#)

[Section 2: Background](#)

[Subsection 2.1: Vicinity Map](#)

[Section 3: Project Planning](#)

[Section 4: Data Collection](#)

[Section 5: Data Processing](#)

[Section 6: Project Summary and Conclusion](#)

[Subsection 6.1: Daily / Safety Reports](#)

[Section 7: Output and Reports from Software](#)

[Subsection 7.1: Quality Control Checklist](#)

[Subsection 7.2: Scope of Work](#)

Section 1: General Project Description

The survey data for this project was gathered in the far eastern section of Lake Pontchartrain, immediately east of Interstate 10, fronting the community of Irish Bayou and Hwy 11. This project also included a proposed borrow pit and access corridors in Lake Borgne near, all in Orleans Parish, LA. This survey data will be used by engineers for evaluation of the existing conditions.

This delivery order consisted of collecting data near Irish Bayou, Louisiana in the form of cross sections utilizing RTK GPS, and hydrographic survey techniques.

Section 2: Background

This survey consisted of collecting 57 cross sections separated into eight (8) data sets. In addition to the sections a GPS network was established to orient control to the 2006.81 epoch. All of the coordinates shown and data computed are referenced to the North American Datum of 1983 (NAD83) and are using State Plane Coordinates for the Louisiana South Zone (1702) in U. S. Survey Feet 2006.81 epoch.

Deliverables to the New Orleans District Corps of Engineers will be one digital copy of this report along with two digital fieldbooks and all other applicable digital files for job# 12-054C.

Section 2.1: Vicinity Map



Section 3: Project Planning

Before going to the field, a survey plan was adopted in the office based upon the Scope of Work and prior planning during project negotiations. After establishing the most effective and efficient schedule of operations, field crews were given their assignments. All provided data, was given to the field supervisor and field crews.

Project files were created for data collectors and the delivery structure was set up on network server. All files were backed up, and the field crew was mobilized to the jobsite upon assurance of Right of Entry.

[Yes] Scope of Work reviewed
[Yes] NOCOE provided data reviewed
[Yes] NOCOE Data Structure implemented
[Yes] New Orleans Codes.dat file included for point codes
[Yes] Correct Job #, Job name, Contract #, and Task # identified

[Yes] Horizontal Control rechecked and identified
[Yes] Vertical Control rechecked and identified
[Yes] Correct Horizontal Datum identified - (NAD-27, NAD-83)
[Yes] Correct Vertical Datum identified - (NGVD-29, NAVD-88)
[Yes] Correct Epoch identified – (2004.65, 2006.81)

[Yes] Trimble project created
[Yes] Schedule or GPS Plan submitted
[Yes] GPS visibility established
[Yes] Blank Forms supplied to field crew

[Yes] Hypack project created
[Yes] Cross Section line file (.lnw) created
[Yes] Gage locations determined
[Yes] Background files included

Yes = acceptable
NA = not applicable

Section 4: Data Collection

GPS data collection was performed with a Trimble R8 base station and R6 rover. GPS sessions were run on the control points within the planned network. This data was then turned into the office where it was taken into Trimble Business Center for processing. A network adjustment was done and corrected coordinates were output. From there processed control points were provided and RTK GPS surveys were performed to collect topographic data. No notable issues arose during the topographic survey. Hydrographic surveys were performed in the two areas where RTK GPS could not be used. See ED-SS_Survey Control section of the delivery structure for details of GPS control monuments.

Field data came into the office in raw GPS files, data collector file format, field books, and GPS Log Sheets that verified the control used. This data was then taken into Trimble Geomatics Office and Trimble Business Center software where rod heights were checked and any corrections needed were applied.

Hydrographic field data came into the office in raw hydrographic survey files. This data was then taken into Hypack 2010 software for processing.

EMC field personnel involved in this project were: Supervisor – D. Greene, PC – R. Hutchinson and crew. Office personnel involved were: M. Mattox, D. Greene, L. Underwood and B. Gray.

Section 5: Data Processing

Trimble Business Center ver. 2.6 software was used to process the Static GPS Network. The network was processed to 2006.81. The 2006.81 epoch data was used to establish control values in creation of the EM and other deliverables. Trimble software was utilized to process the field files (.dc) from the RTK data collection. Then, comma separated files (.csv) were exported from the processed data.

Hypack ver. 10 software was used to process the hydrographic data. Hypack ALL format files were saved containing the edited data. From these files comma separated files (.csv) were exported from the edited data and combined with the comma separated files (.csv) containing the RTK data.

These files contained the RTK and hydrographic cross section shots along with the miscellaneous shots. From these files the .em files were created. Then the .em files were run through lmn.exe where the .830, and other associated files were generated. These files were then reviewed using xview.exe for erroneous shots, spikes and gaps. Survey drivers were used to check the .em for errors as well as generate output files.

Section 6: Project Summary and Conclusion

The overall results of the Planning, Data Collection and Data Processing for job # 12-054C provided a survey that will fulfill the requirements for the purpose of the work as stated by the New Orleans District Corps of Engineers.

Section 6.1: Daily / Safety Reports



EMC, Inc. Daily Report (Field)

Crew's Name

Doug Greene

Date:

Thursday, July 05, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration

Project Phase	Survey
---------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Doug Greene	Project Management	10				10
2							0
3							0
4							0
5							0

Per Diem 1	Total hours Sick, Vacation & Holiday	0
	Project hours Work and Travel	10

Activities:

Project ID	Client	Project Description

Project Phase	
---------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Doug Greene	Project Management					0
2							0
3							0
4							0
5							0

Total hours Sick and Vacation	0
Project hours Work and Travel	0

Activities:
July 4th Holiday



EMC, Inc. Daily Report (Field)

Crew's Name
Doug Greene

Date:
Friday, July 06, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration

Project Phase	Survey
----------------------	--------

	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Doug Greene	Project Management	10				10
2							0
3							0
4							0
5							0

Per Diem 1	Total hours Sick, Vacation & Holiday	0
	Project hours Work and Travel	10

Activities:

GPS Network.

Project ID	Client	Project Description

Project Phase	
----------------------	--

	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Doug Greene	Project Management					0
2							0
3							0
4							0
5							0

Total hours Sick and Vacation	0
Project hours Work and Travel	0

Activities:

July 4th Holiday



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Thursday, July 05, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	4 Man Static GPS Crew	5	5			10
2	Jeremy Clark	Crew Member	5	5			10
3	Thomas E. Clark	Crew Member	5	5			10
4	James Cole	Crew Member	5	5			10
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				40

Activities:

Met at office to pickup equipment, then traveled to New Orleans and met with Doug Greene for job orientation and GPS plan. Recon control monuments and looked for boat ramp and access.

Project ID	Client	Project Description

Project Phase	
----------------------	--

	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday							0
			Project hours Work and Travel				0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Ronny Hutchinson, SR.

Date:

Friday, July 06, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

Employee	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	4 Man Static GPS Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4	James Cole	Crew Member	10				10
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				40

Activities:

Ran GPS static sessions on control points for job; download files, scan data sheets.

Project ID	Client	Project Description

Project Phase	
----------------------	--

Employee	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday						0
Project hours Work and Travel						0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Saturday, July 07, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4	James Cole	Extra Rodman	10				10
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				40

Activities:

Setup RTK base unit and made 2 checkins; run lines 1 through 11 and p[artial lines BB and DD. Topo end of rock dike.

Project ID	Client	Project Description

Project Phase	
----------------------	--

	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday							0
			Project hours Work and Travel				0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Sunday, July 08, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4	James Cole	Extra Rodman	5				5
5							0
Per Diem 1							0
			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				35

Activities:

James Cole worked 5(hrs) then left to pick up boat and meet RC for another job. Setup RTK base unit and made 2 checkins; ran partial lines 12 through 22. Gaps are to be hydroed later.

Project ID	Client	Project Description

Project Phase	
----------------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday **0**
 Project hours Work and Travel **0**

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Monday, July 09, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
---------------	--------

Employee	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0

Per Diem 1

Total hours Sick, Vacation and Holiday

0

Project hours Work and Travel

30

Activities:

Setup RTK base unit and made 2 check ins, ran and complete lines a thru e. Change oil in airboat and adjusted the exhaust pipes.

Project ID	Client	Project Description

Project Phase	
---------------	--

Employee	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday

0

Project hours Work and Travel

0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Tuesday, July 10, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Ran lines F and G +\ -5200 ft of profile. Went to Colemar's to get exhaust pipe and repair air boat exhaust.

Project ID	Client	Project Description

Project Phase	
----------------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday **0**
 Project hours Work and Travel **0**

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Wednesday, July 11, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1							0
			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Setup RTK base unit and made 2 check ins; ran lines H, line 23 and line JJ that will be completed later with hydro. A total of +\ -6500 ft of profile with airboat. Some rain and airboat maintenance.

Project ID	Client	Project Description

Project Phase	
----------------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday **0**
 Project hours Work and Travel **0**

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Thursday, July 12, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
---------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Setup RTK base unit and made 2 check ins; ran partial lines 1 thru N and 29 from dike out into lake.

Project ID	Client	Project Description

Project Phase	
---------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0
			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Monday, July 16, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

Employee	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Setup RTK base unit and made 2 check ins; RTK lines 24 to 28 and 30 to 31. Change oil in airboat and worked on trailer lights.

Project ID	Client	Project Description

Project Phase	
----------------------	--

Employee	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday						0
Project hours Work and Travel						0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Date:

Ronny Hutchinson, SR.

Tuesday, July 17, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Setup RTK base unit and made 2 check ins; ran lines I,J and K. +\ -7600 ft of profile. Buy and make staff gauges for hydro.

Project ID	Client	Project Description

Project Phase	
----------------------	--

	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0
			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

Ronny Hutchinson, SR.

Date:

Wednesday, July 18, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Project Phase	Survey
----------------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	Ronny Hutchinson, Sr.	3 Man RTK Survey Crew	10				10
2	Jeremy Clark	Crew Member	10				10
3	Thomas E. Clark	Crew Member	10				10
4							0
5							0
Per Diem 1			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				30

Activities:

Setup RTK base unit and made 2 check ins. Set 2 staff gauges. Ran lines L, M and N; traveled to Gonzalaes, LA.

Project ID	Client	Project Description

Project Phase	
----------------------	--

#	Employee	Employee Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0
			Total hours Sick, Vacation and Holiday				0
			Project hours Work and Travel				0

Activities:



EMC, Inc. Daily Report (Field)

Crew's Name

James Cole

Date:

Wednesday, July 25, 2012

Project ID	Client	Project Description
12-058	USACE New Orleans	12-054C Bayou Sauvage Side Brackish Marsh Restoration

Project Phase	Survey
----------------------	--------

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1	James Cole	2 Man Hydrographic Crew	5				5
2	Stanley Woods	Crew Member	5				5
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday	0
Project hours Work and Travel	10

Activities:

Ran hydro on Bayou Sauvage

Project ID	Client	Project Description

Project Phase	
----------------------	--

#	Employee	Crew Type	Worked	Traveled	Sick	Vac/Hol	Total
1							0
2							0
3							0
4							0
5							0

Total hours Sick, Vacation and Holiday	0
Project hours Work and Travel	0

Activities:

Section 7: Output and Reports from Software

*See Delivery Structure for Output Results

Subsection 7.1: Quality Control Checklist

Job# 12-054C
Date In: July 19, 2012
Date Out: August 2, 2012

Tech: L. Underwood, D. Greene

General

[Yes] Scope of Work reviewed
[Yes] NOCOE provided data reviewed
[Yes] Control identified and Data processed
[Yes] Correct field books (Reduce levels, correct elev. And epoch, etc.)
[Yes] CSV files created with corrected Y, X, Z, and code information
[Yes] NOCOE Data Structure implemented
[Yes] Create EM files (import corrected XYZ data)
[Yes] All #H-Records included in files
[Yes] Field books and Pages recorded in EM files as applicable
[Yes] Date recorded in EM files as applicable
[Yes] Equipment records included in EM files
[Yes] LMN 830 ran on EM files
[Yes] RPT file created
[Yes] 830 file created
[NA] PRO file created
[NA] SO file created

Horizontal Control

[Yes] Datum Correct as recorded in EM files - (NAD-27, NAD-83)
[NA] Traverse files on disk (T-Files and J-Files)
[NA] Primary Traverse Adjusted (1:5000, 5" /setup) Closure:
[NA] Secondary Traverse Adjusted (1:2500, 10"/setup) Closure:
[Yes] Horizontal Control included in EM files *(Note in EM header)
[NA] Traverses Stationed

Vertical Control

[Yes] Datum Correct (As recorded in EM files)
[Yes] Epoch Correct (As recorded in EM files)
[Yes] Permanent Benchmarks or PBMs included in EM Files (#V Records)
[Yes] Temporary Benchmarks or TBMs included in EM Files (#T Records)
[Yes] Control specified by Corps was used (example: elevation/epoch)
[NA] Do levels meet accuracy requirement
[Yes] Datum and Epoch recorded in Field notes
[Yes] OPUS solution included
[Yes] U-Smart Forms completed

Staff Gage

- [Yes] Gage readings included in EM files before each range
- [NA] Gage readings included in Scrolls
- [NA] Spot check of W.S. interpolation performed
- [Yes] Water Surface read before and after survey
- [NA] Scrolls submitted and annotated with job information

Cross Sections

- [Yes] Spikes checked
- [Yes] Sections normal to B/L or C/L as specified
- [Yes] All sections included
- [Yes] Sections lengths checked
- [Yes] Gaps Checked
- [Yes] Cross Sections viewed in XVIEW.exe

Miscellaneous Points

- [Yes] Descriptions, locations, etc. included in EM files (#M-Records)
- [Yes] All features located and included in EM files.
- [Yes] All points coded using the New Orleans Codes.dat file

GPS Control

- [Yes] Survey checked in Trimble Geomatics Office
- [Yes] Raw files submitted
- [Yes] Processed files submitted
- [Yes] Rinex files created for COE
- [Yes] GPS Log sheets submitted
- [Yes] GPS/Adjustment Report submitted
- [Yes] OPUS solutions submitted
- [Yes] Schedule or GPS Plan submitted
- [Yes] Network Map submitted

Final Check

- [Yes] All fieldbooks scanned and legible
- [Yes] Field Books stamped and signed by PLS
- [Yes] Submitted in EM and 830 formats
- [NA] EM files reviewed in PUT.ma
- [NA] DGN created contains all features specified by this project and meets the CADD Standards
- [NA] Metadata file created
- [NA] Job #, Job name, date, contract #, and task # included on CD label for submittal
- [NA] Transmittal letter to include each file and/or hard item submitted
- [Yes] Survey Report complies with USACE Minimum Survey Standards Section I

Date Submitted

Email Dates: August 2, 2012

CD Date: NA

Hardcopy Date: NA

Yes = acceptable

No = unacceptable

NA = not applicable

Comments:

Subsection 7.2: Scope of Work



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

18 June 2012

Contracting Division
Projects East Branch

EMC, Inc.
Attn: Mark Mattox
2472 Sunset Dr.
Grenada, MS 38901-2828

SUBJECT: W912P8-10-D-0050 Task Order 0028
Job 12-054C Bayou Savage Side Brackish Marsh Restoration, Irish Bayou

Dear Mr. Mattox:

Enclosed is a Scope of Work for the subject proposed task order.

Please provide your proposal in accordance with the contract terms and conditions and the enclosed Scope of Work. Please provide to Contracting Division only. Contracting Division will provide copies to other divisions as required.

Your proposal is due in this office no later than Close of Business 26 June 2012, or sooner, if possible. You may fax your proposal to this office at 504-862-2892, or by email at Bridget.M.Morehiser@usace.army.mil.

If you have any questions, please contact Bridget Morehiser, Contract Specialist, at (504) 862-2876 or via email at: Bridget.M.Morehiser@usace.army.mil.

Sincerely,

Ione M. Cataldo

Ione M. Cataldo
Contracting Officer

Enclosure
As stated

Date: 12 June 2012

CEMVN-L

Author: O'Cain ext: 2746

MEMORANDUM FOR: **C/Design Services Branch**

SUBJECT: **Request for Surveys, HSDRR Bayou Sauvage Mitigation**

ED-SS Job #: 12-054C
(Assigned in ED-SS)

1. **** P2 #** _____
**** ED #** _____ (**Required for relating jobs to the Monthly Engr. Div. Schedule review meeting report)
2. **Date Completed Survey is required:** Contact Wayne Duplantier, ext 1989
(Includes ED-SS Data Processing & QC Time)
3. **Job Title:** H.S.D.R.R., Lake Pontchartrain And Vicinity Mitigation Surveys, New Orleans, La:
Bayou Sauvage Flood Side Brackish Marsh Restoration
4. **Job Location:** Orleans Parish, Vicinity Of Irish Bayou, La

Levee District: Other Other: See Below
Nearest Town: Irish Bayou

The Project Is Located In The Far Eastern Section Of Lake Pontchartrain, Immediately East Of The Interstate 10, Fronting The Community Of Irish Bayou And Hwy 11 In Orleans Parish, Louisiana. In addition, hydro surveys of a proposed borrow pit and access corridor in Lake Borgne will also be performed.

5. **Survey Type:** (Check as Applicable)

- a. Hydrographic Cross-Sections (Borrow Site); Approximate Number: 11

Hydrographic cross sections encompass the borrow site in Lake Pontchartrain. Three (3) of the proposed sections extend totally inshore and tie into the existing bankline (See Drawing C-11 & Addendum sheet).

- b. Overbank/Hydro Combo-Sections (long); Approximate Number: 14

The fourteen "long" cross sections cross each of the three (3) entire marsh creation sites extending beyond the proposed marsh footprint on each side (See Drawing C-11 & Addendum sheet).

- c. Overbank/Hydro Combo-Sections (short); Approximate Number: 32

The 32 "short" cross sections are all 500' in length and provide additional information around the perimeter of the proposed marsh fill sites (for retention dike construction) and/or at the proposed shoreline feature construction sites: rock foreshore at the Lake Pontchartrain shoreline and earthen embankment at the Irish Bayou bankline (See Drawing C-11 & Addendum sheet).

- d. Profile(s); Estimated Length: Refer to SOW usft

None Required.

- e. B/L Traverse; Estimated Length: _____ usft

None Required.

f. Reference Off-sets

g. -Other: Topo Survey - Refer to SOW

6. X-Section Reference:

Distances (DBLs or Offsets) -C/L -B/L
Stationing -C/L -B/L

Section Limits: (choose one)

- Stations
 Ranges
 Mileage

From Section	To Section	Int (ft)
AA	KK	25'
A	N	50'
1	32	20'

Left of BL (ft)	Right of BL (ft)	Shot Int (ft)

7. Survey Control:

	Vertical	Horizontal
Enclosed:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Datum:	NAVD88	NAD83
Epoch:	2006.81 <input checked="" type="checkbox"/> Other <u>Latest</u>	
Accuracy Required:	0.30 ft (most cost efficient)	3 ft

8. Description of work to be performed: See Attached

(Describe in detail and/or attach a separate scope)

9. **LMN830 Format Deliverable:** Yes -No

10. **CADD Format Deliverable:** Yes -No

Description CADD Requirement: _____

(Describe in detail and/or attach a separate scope)

11. **Project Control Monuments (for Construction):** Yes -No

Vertical control
Horizontal control

How many project control monuments are required: 1

Description of location(s) of project control to be established: A/E Contractor Coordinated

Note: Survey control monuments set for the purpose of this survey should not be considered valid project control for construction unless specified. Survey control monuments are set for the purpose of the survey to be performed and not intended to hold their elevations past the dates of the survey.

The locations of the project control must be specified to ensure that they are not set in locations that will be affected during construction.

12. **GIS Format Deliverable:** Yes No

Description GIS Requirement: _____
(Describe in detail and/or attach a separate scope)

13. **Other Value-added Digital Format Deliverable:** Yes No
(e.g. DTMs, Visualizations, AVIs, Models, etc.)

Description Digital Requirement: Google Earth .kmz files and photographs of topo features encountered.
(Describe in detail and/or attach a separate scope)

14. **Right of Entry Available:** Yes, Attached.
 No, Available by: _____
Requested on: _____

15. **Please Provide:** Cost Estimate
 Time Schedule
 Resume of Negotiations

16. **Funding Source:** In-house PR&C Number: _____ (S&A Cost)
Contractual PR&C Number: Wayne Duplantier, ext 1989

17. **5 Copies of Plans, Maps, Drawings, Etc. Enclosed:** Yes No
File URL: _____

18. **Point of Contact:** Keith O'Cain **Ext:** 2746

19. **Functional Team Leader:** Wayne Duplantier **Ext:** 1989

For Survey Job Status information, schedule updates, Survey Frequently Asked Questions and other references, please visit the Survey Section web pages at:
<https://www.intra.mvn.usace.army.mil/ed/edss/>

KEITH O'CAIN
Civil Branch Technical Manager

Encls: Survey Request Addendum
Signed ROE
Plan Drawing (5 Copies)
XY Coordinate Tabulation for Bayou Sauvage
Flood Side Brackish Marsh Special Use Permit

**HSDRRS MITIGATION
SURVEY REQUEST ADDENDUM**

BAYOU SAUVAGE, FLOODSIDE BRACKISH MARSH

1. The following Scope of Work is furnished to assist in the acquisition of the subject surveys. This is a revised survey request due to the addition of a third marsh creation area (BSFS4). This additional area also increased borrow requirements from the Lake Pontchartrain borrow site, which increased hydrographic survey requirements in the lake. The lake shoreline protection between BSFS4 and BSFS3 was increased in length, requiring additional lake shoreline cross sections. Finally, marsh creation area BSFS2 was reshaped, which revised the layout of proposed survey sections to be taken.

- a. Borrow Area Surveys. The area of allowable borrow is located approximately 2,000 feet offshore, and measures approximately 8,000 feet by 1,800 feet. Approximately 11 parallel hydrographic survey lines will be run at 1,000 foot spacing, overlapping the proposed borrow polygon by approximately 500 feet on both sides. The two outer lines will fall outside the proposed borrow footprint. Three (3) of these survey sections will be aligned with the allowable dredge pipeline access corridors, and extend inside the shoreline to obtain water depths between the marsh creation sites and the borrow site. The survey lines in Lake Pontchartrain are labeled **AA** through **KK** on the attached drawing. Shot intervals for required cross sections shall not exceed 25'. XY coordinates defining the endpoints of these lines are included on the attached table.
- b. Fill Area Surveys. The entire proposed marsh creation area will be surveyed. Three (3) separate marsh creation areas are proposed and require survey efforts. The areas are labeled **BSFS2**, **BSFS3**, and **BSFS4** on the attached drawing C-11. Descriptions of required survey lines will be provided separately for each proposed area as follows:
 - 1) **BSFS4**. Two (2) separate sets of survey data are required.
 - Four east/west cross sections across the entire open water area are required at approximate 500 foot spacing. These sections are labeled **A** through **D** on the attached drawing. Shot intervals on these cross sections will be taken at (not to exceed) 50 foot intervals, capturing all significant changes in elevations. Each section will extend 200 foot east and west of the proposed retention dike alignment to quantify the need for retention dike construction and assist in determining existing marsh elevation.
 - Along the northwest and southeast borders of the proposed project footprint, a total of three (3) additional sections shall be taken to quantify required retention dike construction. These sections, labeled **1**, **2**, and **3** on the attached drawing shall be 500' in length, extending 200' outside the marsh footprint, and 300' inside the marsh footprint. Shots will be taken at approximate 20 foot intervals. XY coordinates defining the endpoints of these required survey lines are included on the attached table

**HSDRRS MITIGATION
SURVEY REQUEST ADDENDUM**

**BAYOU SAUVAGE, FLOODSIDE BRACKISH MARSH
(Continued)**

2) BSFS3. Three (3) separate sets of survey data are required.

- Four north/south cross sections across the entire open water area are required at approximate 500 foot spacing. These sections are labeled **E** through **H** on the attached drawing. Shot intervals on these cross sections will be taken at (not to exceed) 50 foot intervals, capturing all significant changes in elevations. Each section will extend 200 foot north and south of the proposed retention dike alignment to quantify the need for retention dike construction and assist in determining existing marsh elevation.
- Eight (8) cross sections are required at the lake shoreline at approximate 400' intervals to quantify and align a proposed rock lake shore foreshore dike. These sections are labeled **4** through **11** on the attached drawing C-11. Shots will be taken at approximate 20 foot intervals. These sections will each be approximately 500 feet in length, beginning approximately 300' lake-ward of the proposed dike alignment and continuing inshore of the dike alignment another 200'.
- The bankline of Irish Bayou will be reconstructed as a retention feature for marsh creation dredged material. Eleven cross sections perpendicular to this alignment are proposed at 400' intervals. These sections are labeled **12** through **22** on the attached drawing. Shots will be taken at approximate 20 foot intervals. These sections will each be approximately 500 feet in length, beginning approximately 300' bayou side of the proposed dike alignment and continuing inshore of the dike alignment another 200'. The proposed bayou side distance should effectively cover the deep water portion of Irish Bayou.

3) BSFS2. Two (2) separate sets of survey data are required.

- Six (6) cross sections of various lengths, fairly perpendicular to the lake, will be taken at approximate 500' intervals across the proposed marsh fill area. These sections are labeled **I** through **N** on the attached drawing. Shot intervals on these cross sections will be taken at (not to exceed) 50 foot intervals, capturing all significant changes in elevation. The cross sections will extend 300 foot lake-ward of the existing rock foreshore dike alignment, and approximately 200' southwest of the proposed backside earthen retention dike alignment. Shot intervals in the vicinity of the existing rock dike shall be tightened to capture all abrupt changes in topography. The 300' lakeside extension is required for rehabilitation to the existing rock structure. The 200' landside extensions of the sections are required to capture existing marsh elevations.

**HSDRRS MITIGATION
SURVEY REQUEST ADDENDUM**

**BAYOU SAUVAGE, FLOODSIDE BRACKISH MARSH
(Continued)**

- Along the northwest and southeast borders of the proposed project footprint, a total of ten additional sections shall be taken to quantify required retention dike construction. These sections, labeled 23 through 32 on the attach drawing C-11 shall be 500' in length, in general extending 200' outside the marsh footprint, and 300' inside the marsh footprint. Shots will be taken at approximate 20 foot intervals. XY coordinates defining the endpoints of these required survey lines are included on the attached table.

 - c. Clearing will be held to the minimum required to accomplish the work. Except for the loss of vegetation necessitated by required clearing, the area will be left in a condition comparable to that prior to this required survey effort.

 - d. Side shots will be taken to locate and identify any protruding structures, signs, pipelines, or utilities within the fill areas, and any other visible topographic features that may have an influence on the project. XY coordinates, descriptions, and photographs of any topographic features found will be required.

 - e. Request a vertical control monument be established for future reference during construction and monitoring procedures. The A/E shall proposed a site for locating this control monument, to be approved prior to installation to assure it does not impact future construction efforts.
2. These surveys will be performed on the Bayou Sauvage Refuge. Special conditions included in a Special Use Permit received from the US F&WL Service will have to be complied with. A copy of the Special Use Permit is attached. A copy of the Special Use Permit must be carried by the Contractor at all times while working on the Bayou Sauvage Refuge.
3. All surveys and submittals shall meet the requirements set forth in the USACE New Orleans District Guide for Minimum Survey Standards document found at:

https://www.intra.mvn.usace.army.mil/ed/edss/USACE_MVN_Min_Survey_Standards.PDF

United States Department of the Interior
U.S. Fish and Wildlife Service
**National Wildlife Refuge System
General Special Use
Application and Permit**

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

Name of Refuge Bayou Sauvage National Wildlife Refuge
Address 61389 Hwy 434
Attn: (Refuge Official) Neil Lalonde, Wildlife Refuge Manager
Phone # 985-882-2026 E-mail neil_lalonde@fws.gov

Application

(To be filled out by applicant. Note: Not all information is required for each use. See instructions at the end of the notice.)

1) New Renewal Modification Other _____

Applicant Information

2) Full Name: Linda C. LaBure 6) Phone #: 504-862-2258
3) Organization: U.S. Army Corps of Engineers 7) Fax #: _____
4) Address: P.O. Box 60267 8) E-mail: _____
5) City/State/Zip: New Orleans, LA 70160-0267

9) Assistants/Subcontractors/Subpermittees: (List full names, addresses and phone #'s and specifically describe services provided if subcontractors are used.)

N/A

Activity Information

10) Activity type: Event Wood Cutting Group Visit Cabin/Subsistence Cabin Educational Activity
 Other Surveys for USACE Flood Side Marsh LPV Mitigation Project

11) Describe Activity: (Specifically identify timing, frequency, and how the event is expected to proceed.)

Environmental and cultural surveys; soil borings; and hazardous, toxic, and radioactive waste assessments in accordance with the attached work plan and maps.

12) Activity/site occupancy timeline: (Specifically identify beginning and ending dates, site occupation timeline, hours, clean-up and other major events.)

February 22, 2012 through September 30, 2012

(Depending on the activity for which you are requesting a permit, we may ask you for the following activity information. Please contact the specific refuge where the activity is being conducted to determine what activity information is required.)

13) Expected number of participants:

Children _____ Adults _____ Total N/A

14) Grade level of educational group:

Grade _____ N/A

15) Will staff time/assistance be required?

Yes No N/A

16a) Plan of Operation required? Yes No N/A

16b) Plan of Operation attached? Yes No

17) Location: (Specifically identify location; GPS location preferred.)

Bayou Sauvage Management Unit 1.
See attached map.

18a) Is map of location(s) required?

Yes No N/A

18b) Is map of location(s) attached?

Yes No

Insurance Coverage/Certifications/Permits

19a) Is insurance required?

Yes No N/A

19b) Insurance: (Provided carrier, type and policy number)

20) Other licenses/certifications/permits required: (Specifically identify licenses, certifications, and permits.)

N/A

Logistics and Transportation

21) Does activity require personnel to stay overnight onsite? Yes No

22) Personnel involved:

See attached.

23) Specifically describe **all** equipment/gear and materials used:

See attached.

24) Transportation description(s) and license number(s) to access refuge(s): [Provide description of and specific auto license/boat/plane registration number(s).]

N/A

25) Specifically describe onsite work and/or living accommodations:

N/A

26) Specifically describe onsite hazardous material storage or other onsite material storage space:

N/A

27) Signature of Applicant Janek R. Cuyper Date of Application: 2/27/12

Sign, date, and print this form and return it to the refuge for processing.
Do not fill out information below this page.

PRINT FORM

For Official Use Only (This section to be filled out by refuge personnel only.)

Special Use Permit

Permit #: 43595-12-06

1) Date: February 22, 2012 2) Permit Approved Permit Denied 3) Station #: 43595

4) Additional special conditions required: (Special conditions may include activity reports, before and after photographs, and other conditions.)
 Yes No N/A

Additional sheets attached:
 Yes No

5) Other licenses/permits required:
 Yes No N/A

Verification of other licenses/permits, type:
N/A

6) Insurance/certifications required:
 Yes No N/A

Verification of insurance/certification, type:
N/A

7) Record of Payments: Exempt Partial Full

Amount of payment: \$0.00 Record of partial payment: _____

8) Bond posted: Yes No

This permit is issued by the U.S. Fish and Wildlife Service and accepted by the applicant signed below, subject to the terms, covenants, obligations, and reservations, expressed or implied herein, and to the notice, conditions, and requirements included or attached. A copy of this permit should be kept on hand so that it may be shown at any time to any refuge staff.

Permit approved and issued by (Signature and title):

Don Jui, Wildlife Refuge Spec. Date: 2/22/12

Permit accepted by (Signature of applicant):

Janet R. Curran Date: 2/22/12

Notice

In accordance with the Privacy Act (5 U.S. C. 552a) and the Paperwork Reduction Act (44 U.S. C. 3501), please note the following information:

1. The issuance of a permit and collection of fees on lands of the National Wildlife Refuge System are authorized by the National Wildlife Refuge System Administration Act (16 U.S. C. 668dd-ee) as amended, and the Refuge Recreation Act (16 U.S. C. 460k-460k-4).
2. The information that you provide is voluntary; however submission of requested information is required to evaluate the qualifications, determine eligibility, and document permit applicants under the above Acts. It is our policy not to use your name for any other purpose. The information is maintained in accordance with the Privacy Act. All information you provide will be considered in reviewing this application. False, fictitious, or fraudulent statements or representations made in the application may be grounds for revocation of the Special Use Permit and may be punishable by fine or imprisonment (18 U.S.C. 1001). Failure to provide all required information is sufficient cause for the U.S. Fish and Wildlife Service to deny a permit.
3. No Members of Congress or Resident Commissioner shall participate in any part of this contract or to any benefit that may arise from it, but this provision shall not pertain to this contract if made with a corporation for its general benefit.
4. The Permittee agrees to be bound by the equal opportunity "nondiscrimination in employment" clause of Executive Order 11246.
5. Routine use disclosures may also be made: (a) to the U.S. Department of Justice when related to litigation or anticipated litigation; (b) of information indicating a violation or potential violation of a statute, rule, order, or license to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting the violation or for enforcing or implementing the statute, rule, regulations, order, or license; (c) from the record of the individual in response to an inquiry from a Congressional office made at the request of the individual (42 FR 19083; April 11, 1977); and (d) to provide addresses obtained from the Internal Revenue Service to debt collection agencies for purposes of locating a debtor to collect or compromise a Federal Claim against the debtor, or to consumer reporting agencies to prepare a commercial credit report for use by the Department (48 FR 54716; December 6, 1983).
6. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. This information collection has been approved by OMB and assigned control number 1018-0102. The public reporting burden for this information collection varies based on the specific refuge use being requested. The relevant public reporting burden for the General Use Special Use Permit Application form is estimated to average 30 minutes per response, including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Comments on this form should be mailed to the Information Collection Clearance Officer, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042-PDM, Arlington, Virginia, 22203.

General Conditions and Requirements

1. **Responsibility of Permittee:** The permittee, by operating on the premises, shall be considered to have accepted these premises with all facilities, fixtures, or improvements in their existing condition as of the date of this permit. At the end of the period specified or upon earlier termination, the permittee shall give up the premises in as good order and condition as when received except for reasonable wear, tear, or damage occurring without fault or negligence. The permittee will fully repay the Service for any and all damage directly or indirectly resulting from negligence or failure on his/her part, and/or the part of anyone of his/her associates, to use reasonable care.
2. **Operating Rules and Laws:** The permittee shall keep the premises in a neat and orderly condition at all times, and shall comply with all municipal, county, and State laws applicable to the operations under the permit as well as all Federal laws, rules, and regulations governing national wildlife refuges and the area described in this permit. The permittee shall comply with all instructions applicable to this permit issued by the refuge official in charge. The permittee shall take all reasonable precautions to prevent the escape of fires and to suppress fires and shall render all reasonable assistance in the suppression of refuge fires.
3. **Use Limitations:** The permittee's use of the described premises is limited to the purposes herein specified and does not, unless provided for in this permit, allow him/her to restrict other authorized entry onto his/her area; and permits the Service to carry on whatever activities are necessary for: (1) protection and maintenance of the premises and adjacent lands administered by the Service; and (2) the management of wildlife and fish using the premises and other Service lands.
4. **Transfer of Privileges:** This permit is not transferable, and no privileges herein mentioned may be sublet or made available to any person or interest not mentioned in this permit. No interest hereunder may accrue through lien or be transferred to a third party without the approval of the Regional Director of the Service and the permit shall not be used for speculative purposes.
5. **Compliance:** The Service's failure to require strict compliance with any of this permit's terms, conditions, and requirements shall not constitute a waiver or be considered as a giving up of the Service's right to thereafter enforce any of the permit's terms or conditions.
6. **Conditions of Permit not Fulfilled:** If the permittee fails to fulfill any of the conditions and requirements set forth herein, all money paid under this permit shall be retained by the Government to be used to satisfy as much of the permittee's obligation as possible.
7. **Payments:** All payment shall be made on or before the due date to the local representative of the Service by a postal money order or check made payable to the U.S. Fish and Wildlife Service.
8. **Termination Policy:** At the termination of this permit the permittee shall immediately give up possession to the Service representative, reserving, however, the rights specified in paragraph 11. If he/she fails to do so, he/she will pay the government, as liquidated damages, an amount double the rate specified in this permit for the entire time possession is withheld. Upon yielding possession, the permittee will still be allowed to reenter as needed to remove his/her property as stated in paragraph 11. The acceptance of any fee for the liquidated damages or any other act of administration relating to the continued tenancy is not to be considered as an affirmation of the permittee's action nor shall it operate as a waiver of the Government's right to terminate or cancel the permit for the breach of any specified condition or requirement.
9. **Revocation Policy:** This permit may be revoked by the Regional Director of the Service without notice for noncompliance with the terms hereof or for violation of general and/or specific laws or regulations governing national wildlife refuges or for nonuse. It is at all times subject to discretionary revocation by the Director of the Service. Upon such revocation the Service, by and through any authorized representative, may take possession of the said premises for its own and sole use, and/or may enter and possess the premises as the agent of the permittee and for his/her account.

10. Damages: The United States shall not be responsible for any loss or damage to property including, but not limited to, growing crops, animals, and machinery or injury to the permittee or his/her relatives, or to the officers, agents, employees, or any other who are on the premises from instructions or by the sufferance of wildlife or employees or representatives of the Government carrying out their official responsibilities. The permittee agrees to save the United States or any of its agencies harmless from any and all claims for damages or losses that may arise to be incident to the flooding of the premises resulting from any associated Government river and harbor, flood control, reclamation, or Tennessee Valley Authority activity.

11. Removal of Permittee's Property: Upon the expiration or termination of this permit, if all rental charges and/or damage claims due to the Government have been paid, the permittee may, within a reasonable period as stated in the permit or as determined by the refuge official in charge, but not to exceed 60 days, remove all structures, machinery, and/or equipment, etc. from the premises for which he/she is responsible. Within this period the permittee must also remove any other of his/her property including his/her acknowledged share of products or crops grown, cut, harvested, stored, or stacked on the premises. Upon failure to remove any of the above items within the aforesaid period, they shall become the property of the United States.

Instructions for Completing Application

You may complete the application portion verbally, in person or electronically and submit to the refuge for review. Note: Please read instructions carefully as not all information is required for each activity. Contact the specific refuge headquarters office where the activity is going to be conducted if you have questions regarding the applicability of a particular item.

1. Identify if permit application is for new, renewal or modification of an existing permit. Permit renewals may not need all information requested. Contact the specific refuge headquarters office where the activity is going to be conducted if you have questions regarding the applicability of a particular item.

2-8. Provide full name, organization (if applicable), address, phone, fax, and e-mail.

9. Provide names and addresses of assistants, subcontractors or subpermittees. Names and address are only required if the assistants, subcontractors or subpermittees will be operating on the refuge without the permittee being present. Volunteers, assistants, subcontractors or subpermittees that are accompanied by the permittee need not be identified.

10. Activity type: check one of the following categories:

- a. Event;
- b. Wood cutting;
- c. Group visit;
- d. Cabin/Subsistence cabin;
- e. Educational activity; or
- f. Other—any other activity(s) not mentioned above. Please describe "other" activity.

11. Describe Activity: provide detailed information on the activity, including times, frequency and how the activity is expected to proceed, etc. Permit renewals may not need activity description, if the activity is unchanged from previous permit. Most repetitive activities, such as group visits, do not require an activity description for each visit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if an activity description is required.

12. Activity/site occupancy timeline: identify beginning and ending dates, site occupation timeline, hours, clean-up and other major events. Permit renewals may not need an activity/site occupancy timeline, if the activity is unchanged from previous permit. Most repetitive activities, such as group visits, do not require an activity/site occupancy timeline for each visit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if an activity/site occupancy timeline is required.

13-14 Expected number of participants: Provide an estimate of the number of adults, and children and grade level of group, if applicable.

15. Identify if onsite refuge staff will be required for group activities and anticipated time frame, if applicable.

16a-16b. Identify and attach Plan of Operation, if required. Most repetitive activities, such as group visits, do not require Plans of Operations for each visit. In addition, permit renewals may not require Plans of Operations if the activity is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a Plan of Operations is required.

17. Location: identify specific location (GPS coordinates preferred), if not a named facility. Most repetitive activities, such as group visits, do not require a location. In addition, permit renewals may not require a location if the activity is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a location is required.

18a-18b. Attach a map of location, if required and not conducted at a named facility. Most repetitive activities, such as group visits, do not require a map. In addition, permit renewals may not require a map if the activity is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a map is required.

19a-19b. Provide name, type and carrier of insurance, if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if insurance and type of insurance are required.

20. Specifically identify types and numbers of other licenses, certifications or permits, if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine the types of licenses, certifications or permits required, and to coordinate the simultaneous application of several types of licenses, certifications or permits. This Special Use Permit (SUP) may be processed while other certifications are being obtained.

21-22. Provide name(s) of any personnel required to stay overnight, if applicable.

23. Identify all equipment and materials, which will be used, if required. Most repetitive events, such as group visits, do not require a list of equipment. In addition, permit renewals may not require a list of equipment if the event is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a list of equipment is required.

24. Describe and provide vehicle descriptions and license plate or identification numbers of all vehicles, including boats and airplanes, if required. Motor vehicle descriptions are only required for permittee vehicle, and/or if the vehicle will be operated on the refuge without the permittee being present. Motor vehicles that are accompanied by the permittee as part of a group (convoy) activity need not be identified if cleared in advance by refuge supervisor. Specifically describe ship-to-shore, intersite (between islands, camps, or other sites) and onsite transportation mechanisms, and license plate or identification numbers, if required.

25. Specifically describe onsite work and/or living accommodations, if applicable.

26. Specifically describe onsite hazardous material storage, or other onsite material storage space (including on and offsite fuel caches).

27. Sign, date, and print the application. Click on the Print button to print the application (if using the fillable version). The refuge official will review and, if approved, fill out the remaining information, sign, and return a copy to you for signature and acceptance.

The form is not valid as a permit unless it includes refuge approval, a station number, a refuge-assigned permit number, and is signed by a refuge official.

Special Use Permit Conditions

43595-12-06

1. All work must be completed in accordance with the attached work plan, map, and special use permit conditions.
2. The refuge manager is the coordinating official having immediate jurisdiction and administrative responsibility for the refuge lands and property. The permittee must coordinate all entry onto these premises with the refuge manager, or his/her authorized representative. Before work may begin, notification of the staff at Bayou Sauvage NWR must occur by phone at (985) 882-2026 or (985) 285-0060.
3. All refuge regulations will be in force, and the permittee is responsible for the actions of employees, contractors, and support personnel. Feeding wildlife is prohibited. Violations of applicable laws or regulations may subject the permittee and his or her employees to prosecution under State and/or Federal laws, and put this permit in jeopardy.
4. The failure of the United States or the Service to require strict performance of the terms, conditions, covenants, agreements, or stipulations of this permit, in the exercise of the permittee's mineral rights on National Wildlife Refuge lands will not constitute a waiver or relinquishment of the right of the United States to strictly enforce thereafter such terms, conditions, covenants, agreements or stipulations which shall, at all times, continue in full force and effect.
5. The permittee will save, hold harmless, defend, and indemnify the United States of America, its agents and employees for losses, damages or judgements and expenses on a bodily injury, death, or property of any nature whatsoever, and by whomsoever made, arising out of the actions, or failure to act, by the permittee, its employees, contractors, subcontractors or agents with respect to the work or storage of supplies or equipment on the refuge.
6. The permittee will follow all applicable State and Federal laws and current industry standards.
7. The discharge of firearms is prohibited on the refuge. Killing or harassing wildlife is prohibited. It is illegal to molest or destroy the home or dens of wildlife. The permittee will keep the effects to fish, wildlife and the environment to an absolute minimum.
8. Littering is prohibited. The permittee must remove all refuse each day of operations. All boats/vehicles are required to have refuse containers to carry out trash daily.
9. The refuge manager and/or staff can at any time inspect all sites occupied by the permittee.
10. Any disturbance impacting vegetation not permitted is not authorized. If additional work is determined to be required, an additional written request must be made and an amendment may be added if approved by the refuge manager. All work must cease until approval is granted.

11. A copy of this permit, map, work plan and special conditions must be in all vehicles and/or vessels while on the refuge.
12. Any equipment or facilities deemed necessary for relocation by the refuge manager for wildlife management purposes shall be performed at the expense of the permittee.
13. All other refuge regulations remain in effect and must be followed. They can be found in 50 CFR(Code of Federal Regulations that govern all National Wildlife Refuges).

End of Special Use Permit Conditions 43595-12-06

HSDRRS BAYOU SAUVAGE
MARSH CREATION
SURVEY LINE - XY COORDINATES

12-Mar-12

ELEMENT NUMBER	LINE NUMBER	X-COORD START	Y-COORD START	X-COORD END	Y-COORD END	TANGENT LENGTH	
LAKE PONTCHARTRAIN PRIMARY & SECONDARY BORROW AREAS	AA	3,750,857	597,999	3,748,417	596,625	2,800	
	BB	3,751,348	597,128	3,746,914	595,463	4,797	
	LINE BB INTERMEDIATE PI =				3,749,179	595,907	
	CC	3,751,838	596,256	3,749,398	594,883	2,800	
	DD	3,752,329	595,385	3,748,289	593,111	4,636	
	EE	3,752,819	594,513	3,750,380	593,140	2,800	
	FF	3,753,310	593,642	3,750,870	592,268	2,800	
	GG	3,753,801	592,771	3,751,361	591,397	2,800	
	HH	3,754,291	591,899	3,751,851	590,526	2,800	
	II	3,754,782	591,028	3,752,342	589,654	2,800	
	JJ	3,755,202	590,281	3,750,930	587,876	4,728	
KK	3,755,891	589,520	3,753,323	587,911	2,800		
LAKE PONTCHARTRAIN FORESHORE ROCK DIKE CONSTRUCTION (500' SECTIONS)	4	3,747,523	595,433	3,747,087	595,188	500	
	5	3,747,736	595,094	3,747,301	594,849	500	
	6	3,747,949	594,755	3,747,514	594,510	500	
	7	3,748,153	594,411	3,747,717	594,165	500	
	8	3,748,339	594,057	3,747,903	593,811	500	
	9	3,748,525	593,702	3,748,089	593,457	500	
	10	3,748,898	592,994	3,748,462	592,749	500	
	11	3,749,081	592,638	3,748,645	592,393	500	
	BSFS4 MARSH SECTIONS	A	3,746,388	597,251	3,745,496	596,635	1,085
		B	3,746,580	596,776	3,745,295	595,888	1,562
		C	3,746,698	596,249	3,745,179	595,199	1,846
D		3,746,905	595,785	3,745,714	594,962	1,448	
ADDITIONAL RETENTION DIKE SECTIONS	1	3,745,807	597,333	3,746,091	596,921	500	
	2	3,746,835	595,065	3,746,550	595,476	500	
	3	3,746,523	594,742	3,746,239	595,154	500	
BSFS3 IRISH BAYOU BANKLINE RESTORATION SECTIONS (500' SECTIONS)	12	3,746,116	594,319	3,745,705	594,035	500	
	13	3,746,346	593,944	3,745,884	593,754	500	
	14	3,746,460	593,522	3,745,970	593,424	500	
	15	3,746,538	593,126	3,746,046	593,037	500	
	16	3,746,610	592,733	3,746,118	592,644	500	
	17	3,746,678	592,342	3,746,188	592,244	500	
	18	3,746,754	591,939	3,746,259	591,867	500	
	19	3,746,812	591,543	3,746,317	591,471	500	
	20	3,746,870	591,148	3,746,375	591,075	500	
	21	3,746,939	590,760	3,746,447	590,672	500	
	22	3,747,014	590,375	3,746,525	590,269	500	
BSFS3 MARSH SECTIONS	E	3,748,194	593,471	3,748,470	591,871	1,624	
	F	3,747,651	593,675	3,748,034	591,456	2,253	
	G	3,747,092	593,978	3,747,589	591,095	2,925	
	H	3,746,479	594,586	3,747,243	590,163	4,489	

HSDRRS BAYOU SAUVAGE
MARSH CREATION
SURVEY LINE - XY COORDINATES

12-Mar-12

ELEMENT NUMBER	LINE NUMBER	X-COORD START	Y-COORD START	X-COORD END	Y-COORD END	TANGENT LENGTH	
BSFS2	I	3,751,225	588,456	3,748,996	586,376	3,049	
	J	3,751,428	587,961	3,749,523	586,184	2,605	
	MARSH SECTIONS	K	3,751,769	587,595	3,750,305	586,230	2,001
		L	3,752,110	587,230	3,750,228	585,474	2,574
		M	3,752,451	586,864	3,750,623	585,159	2,499
		N	3,752,959	586,655	3,751,318	585,124	2,244
BSFS2	23	3,750,496	588,345	3,750,321	587,877	500	
	24	3,749,979	588,438	3,750,112	587,956	500	
	24	3,749,522	588,311	3,749,656	587,829	500	
	26	3,749,015	588,110	3,749,285	587,690	500	
	27	3,748,923	587,537	3,749,404	587,403	500	
	ADDITIONAL RETENTION DIKE SECTIONS (500' SECTIONS)	28	3,748,790	587,137	3,749,191	586,837	500
		29	3,753,285	586,336	3,752,886	586,034	500
		30	3,752,752	585,792	3,752,323	586,049	500
		31	3,752,331	585,461	3,751,902	585,718	500
		32	3,752,064	585,039	3,751,634	585,295	500



US Army Corps
of Engineers®
New Orleans District

Survey Report

HSDRRS, LPV, Bayou Sauvage Flood Side Brackish Marsh,
2nd Request
Irish Bayou, Orleans Parish, LA

Contract No. W912P8-10-D-0050
Job No. 13-155C
Task Order No. 48
September 2013

Prepared for:

Department of the Army
New Orleans District Corps of Engineers
7400 Leake Avenue
New Orleans, LA 70118-3651

Prepared by



2472 Sunset Drive,
Grenada, MS 38901
(662) 226-5166
Mark Mattox

mattox@emcsurvey.com

I hereby certify that the work described in this survey report was performed under my supervision and that the results described and/ or referenced herein are complete and correct to the best of my ability.



Table of Contents

Section 1: General Project Description

A: Project Overview

B: Vicinity Map

Section 2: Background

A: Request for Proposal/Scope of Work

B: Field Reconnaissance/Joint Site Visit

C: SOW Meeting, Contract Proposal, Negotiation Minutes, Notice to Proceed

Section 3: Project Planning

A: Survey Plan

B: Reference Systems and Survey Accuracy

C: Proposed Field/Office QC Measures

D: Key Schedules/Predictions

E: Safety Plan

Section 4: Data Collection

A: Static GPS Control Surveys

B: RTK Surveys

C: GulfNet VRS Surveys

D: Hydrographic Surveys

E: Conventional Traverse

F: Conventional Leveling

G: Structure Surveys

H: LiDAR Surveys

Section 5: Data Processing

A: Static GPS Control Surveys

B: RTK Surveys

C: GulfNet VRS Surveys

D: Hydrographic Surveys

E: Conventional Traverse

F: Conventional Leveling

G: Structure Surveys

H: LiDAR Surveys

Section 6: Project Summary and Conclusion

Section 7: Benchmark Description Forms

Section 8: Checklists

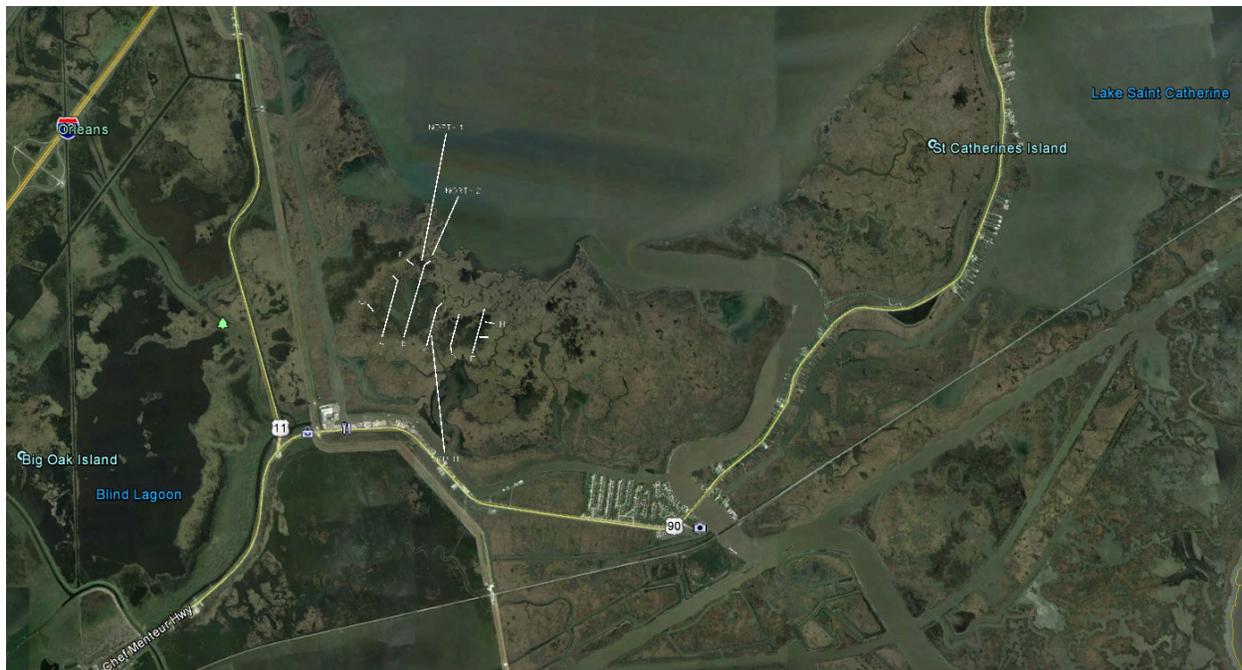
Section 1: General Project Description

A: Project Overview

This is the 2nd Request for survey data from this project. The data was gathered at the far eastern section of Lake Pontchartrain, immediately east of Interstate 10, fronting the community of Irish Bayou and Hwy 11. Surveys of the borrow pit from the original Request for this project is not part of this 2nd Request. The surveys for this 2nd Request consisted of collecting topographic positions and elevations with cross sections and RTK/GPS at specified locations in the shallow water marsh and access channels along with profiles of the same channels as well as a profile along the rock dike. Horizontal and vertical project control came from published points and the previously established control from the original survey request (12-054C). All of the horizontal coordinates shown and data computed are referenced to the North American Datum of 1983 (NAD83) and the vertical data is referenced to provided control in NAVD88 2006.81 epoch.

Deliverables to the New Orleans District Corps of Engineers will be a digital copy of this report along with digital field books and all other applicable digital files for job# 13-155C.

B: Vicinity Map



Section 2: Project Background

A: Request for Proposal/Scope of Work

Request for Proposal received on August 1, 2013. Proposal submitted on August 15, 2013.
See "Scope of Work" below.

B: Field Reconnaissance/Joint Site Visit

Not applicable

C: SOW meeting, Contract Proposal, Negotiation Minutes, Notice to Proceed

Notice to proceed received on August 28, 2013.

ORDER FOR SUPPLIES OR SERVICES

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO. W912P8-10-D-0050	2. DELIVERY ORDER/ CALL NO. 0048	3. DATE OF ORDER/CALL (YYYYMMDD) 2013 Aug 28	4. REQ./ PURCH. REQUEST NO. W42HEM32313268	5. PRIORITY
---	-------------------------------------	--	---	-------------

6. ISSUED BY USACE, CONTRACTING DIVISION ATTN: CEMVN-CT, ROOM 172 7400 LEAKE AVE. NEW ORLEANS LA 70118-3651	CODE W912P8	7. ADMINISTERED BY (if other than 6) SEE ITEM 6	CODE	8. DELIVERY FOB <input checked="" type="checkbox"/> DESTINATION <input type="checkbox"/> OTHER (See Schedule if other)
---	----------------	---	------	---

9. CONTRACTOR EMC, INCORPORATED MARK MATOX 2472 SUNSET DR GRENADA MS 38901-2828	CODE 0D7B0	FACILITY	10. DELIVER TO FOB POINT BY (Date) (YYYYMMDD) SEE SCHEDULE	11. MARK IF BUSINESS IS <input type="checkbox"/> SMALL <input type="checkbox"/> SMALL DISADVANTAGED <input type="checkbox"/> WOMEN-OWNED
			12. DISCOUNT TERMS	
13. MAIL INVOICES TO THE ADDRESS IN BLOCK See Item 15				

14. SHIP TO CONTRACTING DIVISION B2P0000 7400 LEAKE AVE ROOM 172 NEW ORLEANS LA 70118	CODE B2P0000	15. PAYMENT WILL BE MADE BY US ARMY CORPS OF ENGR FINANCE CENTER 5722 INTEGRITY DRIVE MILLINGTON TN 38054-5005	CODE 964145	MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.
---	-----------------	---	----------------	--

16. TYPE OF ORDER	DELIVERY/ CALL	<input checked="" type="checkbox"/>	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
	PURCHASE	<input type="checkbox"/>	Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED (YYYYMMDD)
<input type="checkbox"/> If this box is marked, supplier must sign Acceptance and return the following number of copies:			

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE

See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
SEE SCHEDULE					

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.	24. UNITED STATES OF AMERICA TEL: (504) 862-2882 EMAIL: Ione.M.Cataldo@usace.army.mil BY: IONE M. CATALDO	<i>Ione M. Cataldo</i> CONTRACTING / ORDERING OFFICER	25. TOTAL \$55,368.76	26. DIFFERENCES
--	--	--	--------------------------	-----------------

27a. QUANTITY IN COLUMN 20 HAS BEEN

INSPECTED RECEIVED ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	c. DATE (YYYYMMDD)	d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE
--	-----------------------	---

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	28. SHIP NO.	29. DO VOUCHER NO.	30. INITIALS
f. TELEPHONE NUMBER	g. E-MAIL ADDRESS		32. PAID BY
			33. AMOUNT VERIFIED CORRECT FOR

36. I certify this account is correct and proper for payment.			
a. DATE (YYYYMMDD)	b. SIGNATURE AND TITLE OF CERTIFYING OFFICER		
			34. CHECK NUMBER
			35. BILL OF LADING NO.

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.
-----------------	-----------------	---------------------------------	----------------------	---------------------	---------------------

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		55,368.76	Dollars, U.S.	\$1.00	\$55,368.76

Job 13-155C HSDRSS, LPV, Bayou
 FFP
 Savage Element BSFS Orleans Parish, Irish Bayou.

The above numbered task order is awarded in accordance with the contractors negotiated proposal dated 8/15/2013 and the attached scope of work. Work under this task order shall be completed within 25 days from the award date.

FOB: Destination
 MILSTRIP: W42HEM32313268
 PURCHASE REQUEST NUMBER: W42HEM32313268

NET AMT \$55,368.76

ACRN AA \$55,368.76
 CIN: W42HEM323132680001

Section C - Descriptions and Specifications

SCOPE OF WORKDate: 16 May 2013**CEMVN-ED-L**Author: O'Cain ext: 2746**MEMORANDUM FOR: C/Design Services Branch****SUBJECT: Request for Surveys**ED-SS Job #: 13-155C
(Assigned in ED-SS)

1. **** P2 #** _____
**** ED #** _____ (**Required for relating jobs to the Monthly Engr. Div. Schedule review meeting report)
2. **Date Completed Survey is required:** _____
(Includes ED-SS Data Processing & QC Time)
3. **Job Title:** HSDRRS, LPV, Bayou Sauvage Flood Side Brackish Marsh, 2nd Request
4. **Job Location:** Orleans Parish, Irish Bayou
Levee District: Other Other: See Below
Nearest Town: Irish Bayou, Louisiana

Project is located in the far eastern section of Lake Pontchartrain, immediately east of the Interstate 10, fronting the community of Irish Bayou and Hwy 11 in Orleans Parish, Louisiana.

5. **Survey Type:** (Check as Applicable)

- a. Shallow Water/Marsh Cross-Sections (N/S); No: 5 Approx Length: 12,266 usft
- b. Shallow Water/Marsh Cross-Sections (E/W); No: 4 Approx Length: 1,600 usft

** See attached description of proposed cross sections

- c. Access Channel Profile(s); Estimated Length: 16,048 usft
- d. Access Channel Cross-Section; No: 7 Total Length: 400 usft
- e. Rock Dike Profile Sections; No: 2 Total Length: 400 usft
- f. B/L Traverse; Estimated Length: ___ usft
 New Re-establish Recover Offsets Allowed
- g. Reference Off-sets
- h. Topographic Survey (used to produce contours or DTM)
- i. -Other: _____

6. **X-Section Reference:**

Distances (DBLs or Offsets)	<input type="checkbox"/> -C/L	<input checked="" type="checkbox"/> -B/L
Stationing	<input type="checkbox"/> -C/L	<input type="checkbox"/> -B/L

Section Limits: (choose one)

- Stations
- Ranges (For Shallow Water/Marsh Cross Sections – see attached)
- Mileage

7. Survey Control:

	Vertical	Horizontal
Enclosed:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Datum:	NAVD88	NAD83
Epoch:	2006.81 <input type="checkbox"/> Other <u>Latest</u>	
Accuracy Required:	0.30 ft (most cost efficient)	0.25 ft

8. Description of work to be performed: See Attached

(Describe in detail and/or attach a separate scope)

9. LMN830 Format Deliverable: Yes -No

10. CADD Format Deliverable: Yes -No

Description CADD Requirement: None

(Describe in detail and/or attach a separate scope)

11. Project Control Monuments (for Construction): Yes -No

- Vertical control
- Horizontal control

How many project control monuments are required: 0

Description of location(s) of project control to be established:

Control identified last survey effort. See Job 12-054C

Note: Survey control monuments (as opposed to project control monuments) set for the purpose of this survey should not be considered valid project control for construction unless specified. Survey control monuments are set for the purpose of the survey to be performed and not intended to hold their elevations past the dates of the survey.

The locations of the project control must be specified to ensure that they are not set in locations that will be affected during construction.

12. **GIS Format Deliverable:** Yes No

Description GIS Requirement: _____
(Describe in detail and/or attach a separate scope)

13. **Other Value-added Digital Format Deliverable:** Yes No
(e.g. DTMs, Visualizations, AVIs, Models, etc.)

Description Digital Requirement: Google Earth .kmz files and photographs of topo features encountered.
(Describe in detail and/or attach a separate scope)

14. **Right of Entry Available:** Yes, Attached.
 No

15. **Please Provide:** Cost Estimate
 Time Schedule
 Resume of Negotiations

16. **Funding Source:** In-house PR&C Number: _____ (S&A Cost)
Contractual PR&C Number:

**** Engineering Division POC for funding is Wayne Duplantier, x1989**

17. **5 Copies of Plans, Maps, Drawings, Etc. Enclosed:** Yes No
File URL: _____

18. **Point of Contact:** Keith O'Cain **Ext:** 2746

19. **Functional Team Leader:** Wayne Duplantier **Ext:** 1989

For Survey Job Status information, schedule updates, Survey Frequently Asked Questions and other references, please visit the Survey Section web pages at:
<https://www.intra.mvn.usace.army.mil/ed/edss/>

Keith O'Cain
Civil Branch, Engineering Division

Encls:
Plan Drawing (5 Copies)
Survey Request Addendum (Scope of Work)
XY Coordinate Tabulation

ADDENDUM

HSDRRS MITIGATION
BAYOU SAUVAGE, FLOODSIDE BRACKISH MARSH
ADDITIONAL PROJECT ELEMENT BSFS5
SURVEY REQUEST ADDENDUM

1. General. The following Scope of Work is furnished to assist in the acquisition of Surveys for an additional marsh creation footprint recently added to the proposed project work scope. Previous project element footprints BSFS 2, BSFS3, and BSFS4 have been successfully surveyed in addition to the Lake Pontchartrain project borrow site.

2. Survey Features. Multiple requirements are anticipated to be met with the collection of survey data at this specific project site including open water depths, existing marsh elevations, available access restrictions, and existing rock dike configuration. Descriptions of required survey data collection are provided separately for each proposed area as follows:

- a. Fill Area Surveys. Requirements of this additional survey request include five (5) north/south cross sections of varying lengths across the proposed marsh creation footprint. As the intent of this construction polygon is to both create new marsh in open water areas and nourish existing marsh that exists within the footprint; it is imperative that data collected provide clear understanding of existing open water depths and existing marsh elevations. The proposed cross sections will be taken at approximate 1000 foot intervals. Locations of the desired data collection lines, while defined by XY coordinates provided herein, are not rigid; and can be field modified to provide the best available representation of existing conditions. All cross section endpoints were established to extend approximately 100 feet outside the proposed retention dike footprint. This is to assure that existing target marsh elevations are obtained around the perimeter of the project site. **Please note the multiple cross sections terminate on a “dogleg” to assure best available data collection across the proposed retention dike footprint.** These “doglegs” shall adhere to the requirements of the stubby sections required in the next subparagraph. The survey lines within the marsh creation area are labeled **A** through **E** on the attached drawing. Shots for required cross sections shall be taken at approximate 30 foot intervals, capturing all significant changes in elevations. XY coordinates defining the endpoints of these lines are included on the attached table.
- b. Stubby Surveys. In addition to the cross sections described in the subparagraph above, addition data collection efforts are required around the perimeter of the project footprint to quantify retention dike requirements and obtain additional existing marsh data. Four (4) stubby sections (approximately 300 feet in length), will be taken; two (2) on the east border and two (2) on the west border. The stubby cross sections are labeled **F** through **I** on the attached drawing. Shots for required cross sections shall be taken at approximate 20 foot intervals, capturing all significant changes in elevations. XY coordinates defining the endpoints of these lines are included on the attached table.

- c. Southern Access Corridor. Access to the project site for heavy equipment is proposed via the existing bayous and canals through Chico Lagoon. A profile of this route, approximately one (1) mile in length is requested, with shots taken at approximate 50 foot intervals. The survey should initiate at the centerline of the major bayou to the south. In addition, approximately 3 typical bank to bank cross sections of this access route are required; to depict channel width and available flotation access.
 - d. Northern Access Corridor(s). Access from the Lake Pontchartrain is required for equipment and personnel offloading and discharge pipeline placement. The intent of this survey is to determine not only near shore water depths in the lake, but also to determine the best inshore access route to minimize impact to existing wetlands. Two (2) corridors as shown on the plan view require a centerline profile within the limits shown. The access corridor survey shall begin at the intersection with the proposed borrow site in Lake Pontchartrain. Total profile length is approximately 2 miles. In addition, approximately 2 typical bank to bank cross sections of each access route (4 total) are required; to depict channel width and available flotation access.
 - e. Rock Openings. Each of the proposed northern access routes exit the lake via rock openings; the general locations provided on the attached plan map. It is requested that a typical section be taken (profile along the rock dike) at each opening to depict existing rock height, available width of opening, channel template at opening, etc. The surveyor is requested to probe the opening bottom(s) with a rod to determine if each are rock lined or earthen in nature. The rock profiles shall extend approximately 40 feet on either side of the opening (2 or 3 shots). Rock profile shot intervals shall be at all breaks in grade.
3. Clearing will be held to the minimum required to accomplish the work. Except for the loss of vegetation necessitated by required clearing, the area will be left in a condition comparable to that prior to this required survey effort.
 4. Side shots will be taken to locate and identify any protruding structures, signs, pipelines, or utilities within the fill areas, and any other visible topographic features that may have an influence on the project. XY coordinates, descriptions, and photographs of any topographic features found will be required.
 5. Vertical control monuments were established during the last survey effort for Bayou Sauvage Flood Side marsh. The A/E shall use this existing control monumentation in performing this effort.

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	N/A	N/A	N/A	Government

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	21-SEP-2013	55,368.76	CONTRACTING DIVISION B2P0000 7400 LEAKE AVE ROOM 172 NEW ORLEANS LA 70118 FOB: Destination	B2P0000

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

AA: 96X31250000 082412 323029009H009350 NA 96162

AMOUNT: \$55,368.76

CIN W42HEM323132680001: \$55,368.76

Section 3: Project Planning

A: Survey Plan

Before going to the field, a general survey plan was adopted in the office based upon the Scope of Work and prior planning during project negotiations. After establishing the most effective and efficient schedule of operations, field crews were given their assignments. All provided data, was given to the field supervisor and field crews.

Project files were created for data collectors and the delivery structure was set up on network server. All files were backed up, and the field crew was mobilized to the jobsite upon assurance of Right of Entry. The plan was to use previously established control, from the original survey request (12-054C), and NOCOE provided positions for use throughout the survey. One new benchmark was to be set for the job. After this additional control was set the RTK and hydrographic work began. Processing began as data arrived at the office. When processing was completed, the job submittal was made to the NOCOE.

B: Reference Systems and Survey Accuracy

All datasets were collected, processed and submitted in NAD83 State Plane Louisiana South zone (1702) using U.S. Survey feet. Vertical data is referenced to NAVD88 utilizing Geoid 2012A holding control values based on the 2006.81 epoch. Survey accuracies meet the guidelines as set forth in EM-1110-1-1005 table 6-1.

C: Proposed Field/Office QC Measures

A GPS network was created from the existing and new control for this survey. Control coordinates were provided to survey crews. Field crews were assigned specific tasks to avoid omissions and errors.

Office personnel utilized previous survey information to aid in avoiding errors and omissions.

D: Key Schedules/Predictions

Original due date: 9/21/2013

E: Safety Plan

No job specific safety plan was adopted.

Section 4: Data Collection

A: Static GPS Control Surveys

Positions for the controlling marks for the survey came from previously established control, from the original survey request (12-054C) and from the NOCOE Grid List. Along with the provided control and the previously established control one new monument was set for this job. These marks are listed below:

12-054C-2 2012	(COE brass disk set on a 3/4"x24" rebar, set for job 12-054C)
A 374 1985	(PID BH1811) (flange encased steel rod)
C 189 1963	(PID BH1119) (disk set on top of iron rod)
MVN-17 2012	(flange encased steel rod)
PIKE 1931 1952	(PID BH1164) (triangulation station – bronze disk)
13-155C-1 2013	(New) (mark is a COE aluminum cap set on a 3/4"x24" rebar)

See "Section7: Benchmark Description Forms" for more detailed descriptions of these marks.

B: RTK Surveys

RTK/GPS data collection was performed with Trimble R8 base stations and R6 rovers. RTK surveys were based upon control values provided by the GPS control network.

C: GulfNet VRS Surveys

Not applicable

D: Hydrographic Surveys

Hydrographic field data was collected at specific locations with a single beam Odom Echotrac hydrographic system using DGPS positioning. The hydrographic data came into the office in raw hydrographic survey files. This data was then taken into Hypack 2013 software for processing.

E: Conventional Traverse

Not applicable

F: Conventional Leveling

Not applicable

G: Structure Surveys

Not applicable

H: LiDAR Surveys

Not applicable

Section 5: Data Processing

A: Static GPS Control Surveys

Trimble Business Center software was used for Network Design and Adjustments. Rod heights, point codes and controlling base station coordinates were verified. Upon completion of all checks, the network baselines were processed and the control values were set for the job.

The network is generally designed such that good geometry exists between the known control and the local control. For this network, we were provided by the New Orleans COE the control monuments to use. Monument MVN-17 was held fixed for horizontal and vertical adjustment. The adjustment was analyzed using statistical analyses (mainly through the use of residual outliers) resulting in the best GPS network solution. Additionally, coordinates for the resulting "free" stations were compared to their respective "control" values. Constraints were then added and the above described process was repeated. This process continued until as many of the control values were held as constraints as possible, that is until the quality of the network degrades below that which is acceptable. A complete report containing statistics on both absolute and relative accuracies is included in the submittal. Comma separated files were exported and the results imported into the "V" and "T" records of the .em files.

B: RTK Surveys

Trimble Business Center software was used to process the RTK/GPS data. Rod heights, point codes and controlling base station coordinates were verified. Upon completion of all checks, comma separated files were exported and used to create the cross sections, profiles and miscellaneous parts of the .em files.

C: GulfNet VRS Surveys

Not applicable

D: Hydrographic Surveys

Hypack ver. 2013 software was used to process the hydrographic data. Tide correction values were obtained from the RTK survey and applied to the hydrographic data during the editing process. Tide corrected Hypack ALL format files were saved containing the edited data. From these files comma separated files (.csv) were exported from the edited data and combined with the above mentioned comma separated files (.csv) containing the RTK data.

These combined files contained the RTK and hydrographic cross section shots along with the profile and miscellaneous shots. From these files the .em files were created. Then the .em files were run through lmn.exe where the .830, and other associated files were generated. These files were then reviewed using xview.exe for erroneous shots, spikes and gaps. Survey drivers were used to check the .em for errors as well and generate additional output files.

E: Conventional Traverse

Not applicable

F: Conventional Leveling

Not applicable

G: Structure Surveys

Not applicable

H: LiDAR Surveys

Not applicable

Section 6: Project Summary and Conclusion

The scope of work called for cross sections and profiles at specific locations on the eastern side of Lake Pontchartrain. These cross sections and profiles along with the overall results of the planning provide a survey that should fulfill the requirements for the purpose of the work as stated by the Scope of Work.

Section 7: Benchmark Description Forms

*See ED-SS_Survey Control for BM Forms

Section 8: Checklists

Job# EMC13155C **Tech:** L. Underwood, B. Gray, D. Greene
Date In: September 16, 2013
Date Out: September 24, 2013

General

- [Yes] Scope of Work reviewed
- [Yes] NOCOE provided data reviewed
- [Yes] Control identified and Data processed
- [Yes] Correct field books (Reduce levels, correct elev. And epoch, etc.)
- [Yes] CSV files created with corrected Y, X, Z, and code information
- [Yes] NOCOE Data Structure implemented
- [Yes] Create EM files (import corrected XYZ data)
- [Yes] All #H-Records included in files
- [Yes] Field books and Pages recorded in EM files as applicable
- [Yes] Date recorded in EM files as applicable
- [Yes] Equipment records included in EM files
- [Yes] LMN 830 ran on EM files
- [Yes] RPT file created
- [Yes] 830 file created
- [Yes] PRO file created
- [NA] SO file created

Horizontal Control

- [Yes] Datum Correct as recorded in EM files - (NAD-27, NAD-83)
- [NA] Traverse files on disk (T-Files and J-Files)
- [NA] Primary Traverse Adjusted (1:5000, 5" /setup) Closure:
- [NA] Secondary Traverse Adjusted (1:2500, 10"/setup) Closure:
- [Yes] Horizontal Control included in EM files *(Note in EM header)
- [NA] Traverses Stationed

Vertical Control

- [Yes] Datum Correct (As recorded in EM files)
- [Yes] Epoch Correct (As recorded in EM files)
- [Yes] Permanent Benchmarks or PBMs included in EM Files (#V Records)
- [Yes] Temporary Benchmarks or TBMs included in EM Files (#T Records)
- [Yes] Control specified by Corps was used (example: elevation/epoch)
- [NA] Do levels meet accuracy requirement
- [Yes] Datum and Epoch recorded in Field notes
- [NA] OPUS solution included
- [Yes] U-Smart Forms completed

Staff Gage

- [NA] Gage readings included in EM files before each range
- [NA] Gage readings included in Scrolls
- [NA] Spot check of W.S. interpolation performed
- [Yes] Water Surface read before and after survey (RTK water surface)
- [NA] Scrolls submitted and annotated with job information

Cross Sections

- [Yes] Spikes checked
- [NA] Sections normal to B/L or C/L as specified
- [Yes] All sections included
- [Yes] Sections lengths checked
- [Yes] Gaps Checked
- [Yes] Cross Sections viewed in XVIEW.exe

Miscellaneous Points

- [Yes] Descriptions, locations, etc. included in EM files (#M-Records)
- [Yes] All features located and included in EM files.
- [Yes] All points coded using the New Orleans Codes.dat file

GPS Control

- [Yes] Survey checked in Trimble Geomatics Office
- [Yes] Raw files submitted
- [Yes] Processed files submitted
- [Yes] Rinex files created for COE
- [Yes] GPS Log sheets submitted
- [Yes] GPS/Adjustment Report submitted
- [NA] OPUS solutions submitted
- [Yes] Schedule or GPS Plan submitted
- [Yes] Network Map submitted

Final Check

- [Yes] All field books scanned and legible
- [Yes] Field Books stamped and signed by PLS
- [Yes] Submitted in EM and 830 formats
- [NA] EM files reviewed in PUT.ma
- [NA] DGN created contains all features specified by this project and meets the CADD Standards
- [NA] Metadata file created
- [Yes] Job #, Job name, date, contract #, and task # included on CD label for submittal
- [Yes] Transmittal letter to include each file and/or hard item submitted
- [Yes] Survey Report complies with USACE Minimum Survey Standards Section I

Date Submitted

Email Dates: September 24, 2013

CD Date: NA

Hardcopy Date: NA

Yes = acceptable

No = unacceptable

NA = not applicable

Comments:

APPENDIX C

QUANTITY CALCULATIONS

BSFS-4 Marsh Quantities

Neatline

Sta.	Area (SF)	Vol (CF)	Vol (CY)
0	6263.9		
500	6263.9	3,131,950.00	115,998.15
1000	8278.37	3,635,567.50	134,650.65
1500	6362.11	3,660,120.00	135,560.00
2000	3300	2,415,527.50	89,463.98
2160	979	342,320.00	12,678.52

Total 488,351.30 CY

Foundation

footprint at toe (SF)	depth	Vol (CF)	Vol (CY)	40%
1,984,745.00	4	7,938,980.00	294,036.30	117,614.52

Total 605,965.81 CY

Total	605,965.81 CY
Dike Borrow	200,000 CY
Marsh Total	805,965.81 CY
Use	800,000.00 CY

BSFS-5 Dike Quantities

Dike Cross Section Area 411 SF
 Dike Length 17982 lf
 Cross Dike Length 2003 1f

Dike Neatline quantity (average ground elevation -2.0')			
Area (SF)	Length (ft)	Vol (CF)	Vol (CY)
411	19985	8,213,835.00	304,216.11

8' of peat at surface with high moisture in the range of 250 to 872%.

Foundation

Area (SF)	Length (ft)	Vol (CF)	Vol (CY)	50%
80	19985	1,598,800.00	59,214.81	29,607.41

Total 333,823.52 CY

Borrow Bulking factor

From elevation 0' to -8' is peat with high moisture. From -8 to -15
 moisture content is below 60%, but material is soft very soft

Assumed bulking factor 50 %

Total 500,735.28 CY

Use 500,000 CY

BSFS-5 Marsh Fill Quantities

Neatline			
Sta.	Area (SF)	Vol (CF)	Vol (CY)
0	9964.97		
500	9964.97	4,982,485.00	184,536.48
1000	7628.21	4,398,295.00	162,899.81
1500	7335.09	3,740,825.00	138,549.07
2500	9598.16	8,466,625.00	313,578.70
3500	18228.6	13,913,380.00	515,310.37
4500	12048.45	15,138,525.00	560,686.11
5000	2932.64	3,745,272.50	138,713.80
5400	3601.5	1,306,828.00	48,401.04
		total	2,062,675.39

Foundation				
footprint at toe (SF)	depth	Vol (CF)	Vol (CY)	60%
10,777,187.00	8	86,217,496.00	3,193,240.59	1,915,944.36

Total 3,978,619.74 CY

Total 3,978,619.74 CY
 Dike Borrow 500,000 CY
Marsh Total 4,478,619.74 CY

Use **4,500,000 CY**

APPENDIX D

GEOTECHNICAL INVESTIATIONS

(Due to file size, this appendix will be provided under separate cover)